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27th Annual Session
AMERICAN CONGRESS OF PHYSICAL MEDICINE

September 6, 7, 8, 9, 10, 1949

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VOLUME XXX

JULY, 1949

NO. 7

American Congress of Physical Medicine

27th Annual

Scientific and Clinical Session

Instruction Course

September 6, 7, 8, 9 and 10, 1949



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AMERICAN CONGRESS OF PHYSICAL MEDICINE

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TENTATIVE SCHEDULE

Physicians only may enroll for letter series		Physicians and qualified technicians may enroll for numbered series	
TUESDAY MORNING — SEPTEMBER 6		TUESDAY MORNING — SEPTEMBER 6	
(A) 10:00-10:50 A.M. Functional Anatomy of Shoulder and Arm Movie Demonstration Parlor H	(B) 11:00-11:50 A.M. Functional Anatomy of Hand Movie Demonstration Parlor H	(1) 10:00-10:50 A.M. Braces: Anatomic Considerations in Prescribing and Fitting Parlor I	(2) 11:00-11:50 A.M. Special Braces to Favor Functional Activity Parlor I
TUESDAY AFTERNOON — SEPTEMBER 6		TUESDAY AFTERNOON — SEPTEMBER 6	
(C) 3:00-3:50 P.M. Therapeutic Exercise: Basic Principles Underlying Parlor H	(D) 4:00-4:50 P.M. Therapeutic Exercise: Neuromuscular Basis for Parlor H	(3) 3:00-3:50 P.M. Electrodiagnosis: Clinical Uses and Interpretation of Golseth-Fizzell Apparatus Parlor I	(4) 4:00-4:50 P.M. Multiple Sclerosis: Evaluation and Prognosis for Physical Rehabilitation Parlor I
WEDNESDAY MORNING — SEPTEMBER 7		WEDNESDAY MORNING — SEPTEMBER 7	
(E) 8:30-9:20 A.M. Functional Anatomy of Hip and Thigh Movie Demonstration Parlor H	(F) 9:30-10:20 A.M. Functional Anatomy of Lower Leg and Knee Movie Demonstration Parlor H	(5) 8:30-9:20 A.M. Muscular Imbalance: Evaluation and Treatment Parlor I	(6) 9:30-10:20 A.M. Research in Brace Making Parlor I
THURSDAY MORNING — SEPTEMBER 8		THURSDAY MORNING — SEPTEMBER 8	
(G) 8:30-9:20 A.M. Movement Patterns in Infants and Children Parlor H	(H) 9:30-10:20 A.M. Movement Patterns in Infants and Children Parlor H	(7) 8:30-9:20 A.M. Cerebral Palsy (Spastic): Diagnosis and Prognosis Parlor I	(8) 9:30-10:20 A.M. Cerebral Palsy (Spastic) Patients: Muscle Reeducation Parlor I
FRIDAY MORNING — SEPTEMBER 9		FRIDAY MORNING — SEPTEMBER 9	
(J) 8:30-9:20 A.M. Recent Developments in Physiology of Exercise Parlor H	(K) 9:30-10:20 A.M. Application of Electrical Principles to Vascular and Car- diovascular Problems Parlor H	(9) 8:30-9:20 A.M. Development of a Rehabilitation Center Parlor I	(10) 9:30-10:20 A.M. Muscle Strength Test- ing: Method, Inter- pretation and Import- ance in Evaluation for Rehabilitation Parlor I

Note: The Committee on Education of the American Congress of Physical Medicine is in charge of the instruction seminar. It is purposely planned to limit the subjects in any year to a few topics, in order to devote enough time to those subjects to give those attending a good review, both from the standpoint of basic knowledge and from the clinical standpoint. Certain groups of these subjects will be repeated every three to five years.

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ARCHIVES OF PHYSICAL MEDICINE

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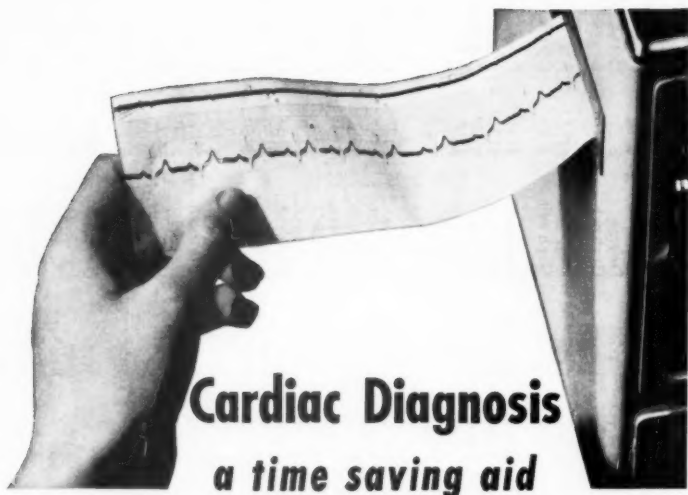
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University of California Hospital, San Francisco ¹	Miss Charlotte W. Anderson	d	12 mos.	Sept	16	\$220 ²	Cert. or Degree
Stanford University, Stanford University, Calif. ¹	Miss M. Eisinger, M.D. Miss M. W. W. W. W.	a-b-d	12 mos.	Varies	18	\$520	Cert. or Degree
University of Colorado Medical Center, Denver ¹	Miss Lucille Daniels	a-b-d	12 mos.	Sept	12	\$300 ³	Cert. or Degree
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State University of Iowa Medical School, Iowa City ¹	John S. Conner, M.D.	c	12 mos.	Sept	15	\$200	Certificate
University of Kansas School of Medicine, Kansas City ¹	W. D. Paul, M.D.	a-b-d	12 mos.	FebSept	15	\$ 80 ⁴	Cert. or Degree
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Simmons College, Boston	Mrs. Ruth G. Monteth	H.S.-e	11½-41½ yrs.	Sept	25	\$550	Dipl. or Degree
Boston University College of Physical Education for Women,	Miss Catherine Graham	H.S.-e-d	1-4 yrs.	Sept	30	\$450	Cert. or Degree
Sargent College, Cambridge, Mass.	Kenneth Christopher, M.D.	H.S.	4 yrs.	Sept	16	\$500 ⁵	Certificate
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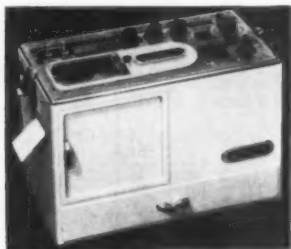
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NOTE: The duration of the course is expressed in academic years

Name and Location of School	College Affiliation	Duration of Course	Classes Start	Entrance Requirements	Tuition Per Year	Certificate, Diploma	Grads in 1947
University of Southern California, 923 1/2 35th Place, Los Angeles	University of Southern California	2 yrs.	FebSept	Degree	\$420	Certificate	22
Mills College, Oakland, Calif.	Mills College	3 yrs.	FebSept	High sch. Degree	\$450	Cert.&B.S.	
San Jose State College, San Jose, Calif.	San Jose State College	1 1/2 yrs.	Varies	Degree	\$550	Certificate	10
University of Illinois College of Medicine, 1853 W. Polk St., Chicago	University of Illinois	3 3/4 yrs.	Varies	High sch.	\$ 21	Degree	
University of Iowa, Iowa City, Iowa	State University of Iowa, College of Medicine	5 yrs.	Feb	High sch.	\$152	B.S.	14
University of Kansas, Lawrence	University of Kansas	2 yrs.	FebSept	Degree	\$131	Certificate	10
Boston School of Occupational Therapy, 7 Harcourt St., Boston		4 yrs.	FebSept	High sch.	\$131	B.S.	
Wayne University, 4841 Cass, Detroit, Mich.	Tufts College of Med., Coll. of Liberal Arts, Coll. of Education	2 yrs.	FebSept	High sch.	\$500	Diploma	13
Kalamazoo School of Occupational Therapy, Western Michigan College of Education, Kalamazoo	Western Michigan College of Education	4 yrs.	FebSept	Degree	\$450	B.S.	
Michigan State Normal College, Ypsilanti	University of Michigan	5 yrs.	Varies	High sch.		Cert.&Deg.	20
University of Minnesota, Church Street, Minneapolis	University of Minnesota	4 yrs.	Varies	High sch.	\$118	R.S.	8
College of St. Catherine, St. Paul, Minn.	The College of St. Catherine	3 1/2 yrs.	Varies	High sch.	\$360	Degree	4
Washington University School of Medicine, St. Louis	Washington University	3 yrs.	Sept	High sch.	\$210	Degree	10
University of New Hampshire, Durham	Univ. of New Hampshire	5 yrs.	Sept	High sch.	\$400	Cert.&Deg.	6
Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York City	Columbia University	2 1/2 yrs.	Sept	High sch.	\$160	Certificate	28
New York University School of Education, 100 Washington Sq. E., New York City	New York University	4 1/2 yrs.	FebSept	High sch.	\$450	Degree	
Ohio State University, Columbus	Ohio State University	3 yrs.	Quarterly	High sch.	\$500	Cert.&Deg.	20
Philadelphia School of Occupational Therapy, 419 S. 19th St., Philadelphia	University of Pennsylvania	1 1/2 yrs.	Sept	Degree	\$500	Diploma	21
Texas State College for Women, Denton, Tex.	University of Pennsylvania	3 yrs.	Sept	Diploma	\$600	Diploma	35
Richmond Professional Institute, 901 W. Franklin St., Richmond, Va.	Texas State College for Women	5 yrs.	FebSept	High sch.	\$150	Degree	13
College of Puget Sound, Tacoma, Wash.	Medical College of Virginia	1 1/2 yrs.	Sept	Degree	\$200	Certificate	20
University of Wisconsin, Madison	College of Puget Sound	3 yrs.	Sept	Degree	\$350	Certificate	
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Mount Mary College, 2900 Menomonee River Dr., Milwaukee	Milwaukee-Downer College	2 1/2 yrs.	FebSept	High sch.	\$320	Cert.&Deg.	22
University of Toronto, Dept. of University Extension, Toronto, Ont., Canada	Milwaukee-Downer College	4 yrs.	Sept	High sch.	\$300	Diploma	
Colorado Agricultural and Mechanical College, Fort Collins, Colorado	University of Toronto	5 yrs.	Sept	High sch.	\$335	Dipl.&Deg.	15
		3 yrs.	Sept	High sch.	\$260	Certificate	110
		5 yrs.	Sept	High sch.	\$222	B.S. Degree	
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STUDIES OF DEEP CIRCULATORY RESPONSE TO SHORT WAVE DIATHERMY AND MICROWAVE DIATHERMY IN MAN *

FREDERIC J. KOTTKE, M.D.

DONALD W. KOZA, M.D.

WILLIAM G. KUBICEK, Ph.D.

and

MILDRED OLSON, B.S.

MINNEAPOLIS, MINNESOTA

The local response to an increase of tissue temperature generally has been considered to be an increase in local circulation and metabolism.¹ Generally with a normal vascular system the increase in circulation is greater than the increase of metabolism, resulting in better nutrition of the tissue cells and more adequate removal of metabolites. These changes are considered to be the basis for the beneficial effects of thermotherapy. It has been demonstrated that diathermy is effective in heating deep tissues of the body. By insertion of thermocouples after heating with diathermy, it has been demonstrated that short wave diathermy causes a significant increase in the temperature of the thigh muscles of man,² the liver, spleen, lung and kidney of the anesthetized dog^{2a} and the cerebrospinal fluid in man.³

Although increases in temperature at considerable depth have been demonstrated, studies of the concomitant changes of deep circulation do not indicate that the response to deep heating necessarily corresponds to the changes accompanying superficial heating. Studies of circulatory changes in the extremities in response to heat do not always agree. Here there are two general types of tissue, skin and muscle, either or both of which may show circulatory changes. Direct heating generally increases the circulation as indicated by plethysmographic studies, but the site of increase is unknown.⁴ Ernst⁵ studied heat transfer from the hand, using the Stewart calorimeter following diathermy applied to the arm, and found that the circulation to the hand was diminished. Kemp, Paul and Hines⁶ showed that short wave diathermy applied to the leg of the anesthetized dog did not increase the circulation through the femoral vein, but, rather, caused a decrease of blood flow although the tissue temperature was increased 1.0 to 4.0 degrees C. On the other hand, similar treatment with microwave diathermy generally

* From the Division of Physical Medicine and the Department of Physiology, University of Minnesota Medical School.

¹ This investigation was supported by a grant from the Baruch Committee on Physical Medicine.

² Read at the Twenty-Sixth Annual Session of the American Congress of Physical Medicine, Washington, D. C., Sept. 9, 1948.

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2. (a) Mortimer, B., and Osborne, S. L.: Short Wave Diathermy; Some Biologic Observations, J. A. M. A. 104:1413, 1935. (b) Mortimer, B., and Beard, G.: Tissue Heating by Short Wave Diathermy, *ibid.* 106:519, 1935. (c) Coulter, J. S., and Carter, H. A.: Heating of Human Tissues by Short Wave Diathermy, *ibid.* 106:2063, 1936.

3. Bierman, W., and Fetteberg, S.: Influence of Short Wave Current on Intraspinal Temperature, Arch. Phys. Therapy 25:263, 1944.

4. Wise, C. S.: The Effect of Diathermy on Blood Flow: Plethysmographic Studies, Arch. Phys. Med. 29:17, 1948. Abramson, D. I.; Zazec, H., and Morris, J.: Plethysmographic Studies of Peripheral Blood Flow in Man: II. Physiologic Factors Affecting Resting Blood Flow in the Extremities, Am. Heart J. 17:206, 1939.

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increased the circulation as well as the temperature. Krusen and co-workers⁷ also reported that microwave diathermy increased the circulation and temperature of the thigh of the anesthetized dog.

Mart⁸ applied diathermy to the anterior chest wall of the anesthetized dog and found that although the myocardial temperature rose 3.2 degrees C. the blood flow from the coronary sinus did not increase.

The circulation of the kidney has been demonstrated to respond to direct heating by long wave diathermy with vasodilatation and increased blood flow. Eppinger and his co-workers⁹ found that when electrodes were applied directly to the surface of the kidney of the anesthetized dog the blood flow would increase in proportion to the heating. Since the blood flow in the kidney can be measured by clearance techniques, the opportunity is provided to study the effects of various types of heating on the deep blood flow in human subjects. The present work was undertaken to compare the effects on renal circulation of heating with microwave diathermy with those observed when heating with short wave diathermy.

Methods

Renal circulation was estimated with use of the clearance of sodium paraaminohippurate at blood levels of 2 to 5 mg. per hundred cubic centimeters to estimate renal plasma flow¹⁰ and clearance of sodium thiosulfate at blood levels of 10 to 20 mg. per hundred cubic centimeters to estimate glomerular filtration.¹¹ Blood levels were maintained during the course of the experiment by injecting the thiosulfate and paraaminohippurate at a constant rate with an injection pump. A needle in a superficial vein of the opposite arm, kept open by slow infusion of heparinized saline solution, was used to collect a blood sample at the middle of each collection period. Urine samples were obtained by catheter and the bladder flushed four times with 30 cc. volumes of isotonic saline solution at the end of each collection period. Collection periods of twenty minutes' duration were run consecutively throughout the test. Microwave diathermy (approximately 12 cm. wavelength) was applied to the back with a Raytheon Microtherm with a rectangular director having a spot focus. The director was 3 inches from the surface of the back, centered over the left kidney. The output of the machine was maintained at 70 per cent throughout the interval of heating, as recommended by the manufacturers for that director and distance. The short wave diathermy machine was either a Burdick X85 with a wavelength of 22 meters or a Fischer machine with a wavelength of 12 meters. A pancake induction coil was placed beneath the subject, centered at the middle of the back. It was separated from the patient by 3 cm. of padding. The heat input was approximately the comfortable heat tolerance level. A control period without heating preceded and followed the period of heating. The first period after the beginning of heating and the first period after heating was discontinued were considered transition periods; accordingly they are treated separately. All other values for renal circulation are the means of two or three consecutive twenty minute periods.

Results

Seven experiments were conducted on young adult male subjects to study the effect on the renal circulation of heating with short wave diathermy. Renal plasma flow and glomerular filtration corrected to a mean body surface area of 1.73 square meters were determined before, during and after diathermy

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10. Finkelstein, N.; Aliminos, L., and Smith, H. W.: The Renal Clearance of Hippuric Acid and Pyridine Derivatives, Am. J. Physiol. 133:276, 1943.

11. Gilman, A.; Philips, F. S., and Koelle, E. S.: The Renal Clearance of Thiosulfate with Observations on Its Volume Distribution, Am. J. Physiol. 146:348, 1946.

(table 1). The initial control plasma flow in all cases was in the normal range. Diathermy heating to the back caused the renal plasma flow to diminish in all cases. In the initial transition period when heating was first begun the renal plasma flow usually did not diminish as much as in the subsequent periods. Circulatory adjustment during diathermy heating resulted in a decrease of renal plasma flow of 16 to 33 per cent. The decrease of glomerular filtration was less than the decrease of plasma flow, resulting in an increase in the filtration fraction. Repeated determinations of blood pressure during the period of heating showed no consistent changes; small variations in either direction might occur during the course of the experiment.

TABLE 1. — *The Effect of Heat Applied to the Back by a Short Wave Diathermy Pancake Coil on Renal Plasma Flow, Glomerular Filtration and Filtration Fraction of Normal Adult Male Subjects.**

Patient	Blood Pressure	Control			Diathermy						Control			% Decrease of RPF During Diathermy
		RPF	GF	FF	First 20 Minutes			Second Period			RPF	GF	FF	
		Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	
1	126/80	830	146	17.6	621	110	17.7	600	108	18.0	524	120	22.9	27.7
2	140/86	602	116	18.8	900	177	19.7	473	96	20.3	464	108	23.3	21.6
3	140/88	747	151	20.3	680	178	26.2	550	140	25.5	563	113	20.0	26.2
4	114/76	742	136	18.3	580	120	20.7	509	101	20.0	563	113	20.0	31.8
5	124/82	812	131	16.2	745	122	16.4	623	111	18.1	751	122	16.3	23.2
6	114/74	713	126	17.6	453	86	19.0	478	102	21.3	549	112	20.5	33.0
7	118/68	783	145	18.5	850	161	19.0	660	144	21.8	730	154	21.1	15.7

* All flows are corrected to a body surface area of 1.73 square meter.

Five experiments were run on normal subjects with use of the Raytheon Microtherm at 70 per cent output to heat the back over the area of the left kidney (table 2). The effect on renal circulation was similar to that obtained

TABLE 2. — *The Effect of Heat Applied to the Back by a Microtherm on Renal Plasma Flow, Glomerular Filtration and Filtration Fraction of Normal Adult Male Subjects.**

Patient	Blood Pressure	Control			Diathermy						Control			% Decrease of RPF During Diathermy
		RPF	GF	FF	First 20 Minutes			Second Period			RPF	GF	FF	
		Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	Cc./Min.	Cc./Min.	Per Cent	
1	120/72	798	131	16.4	614	128	20.8	580	121	20.8	630	135	21.4	27.2
2	116/90	734	168	22.8	566	157	27.7	521	159	30.5	622	172	27.5	29.0
3	118/66	743	130	17.5	681	113	16.3	694	108	15.6	970	163	16.8	6.6
4	120/72	655	131	20.0	420	117	27.9	432	118	27.4	415	107	26.8	34.4
5	110/64	1176	205	17.4	922	170	18.4	875	171	19.6	1024	179	17.4	25.5

* The rectangular director was held 3 inches from the back and the machine run at 70 per cent. All flows are corrected to a body surface area of 1.73 per cent.

with short wave diathermy. There was a decrease of glomerular filtration and renal plasma flow and an increase in filtration fraction. The decrease in renal circulation during heating, except in 1 subject who showed a decrease of 6.6 per cent, was greater than 25 per cent. The variations of blood pressure were small and inconsistent. After heating was discontinued, the renal circulation slowly increased toward the initial level again.

Comment

These observations of the decrease of renal circulation during heating with short wave diathermy extend the observation reported previously.¹² It appears that the effect is not influenced by the location of the application of heat. The previous work showed that the same results were obtained when heat was applied to the back as when it was applied to the head. Therefore it is unlikely that direct heating of the kidney had any effect on the circulatory changes observed. Heating with microwave diathermy had the same effect on renal circulation as heating with short wave diathermy. Because of the limited area which could be heated with the available directors the microwave heating was centered over the left kidney. If heating were effective in increasing circulation in one kidney this should have been demonstrable with the methods used. However, microwave heating caused the same type of renal vasoconstriction as was observed previously for short wave diathermy.

It appears that there are two distinct types of response of the body to heat. Local intense heating in a circumscribed area of the surface of the body by stimulating temperature sensitive endings and increasing metabolites, causes local vasodilatation and increases local circulation. Under these conditions heat is rapidly removed from the heated area and the local increase of tissue temperature is much less than it would be if there were no circulatory response. Because of the increased circulation, the superficial tissues are protected against thermal damage and there is little penetration of heat to the deeper tissues. On the other hand, when large amounts of heat are applied to the body, the predominant reflexes are concerned with dissipation of heat from the body. Cutaneous vasodilatation occurs with flushing, sweating and an increased skin temperature increasing the rate of heat loss from the body surface. To maintain the blood pressure in the face of this increased peripheral circulation cardiovascular readjustments are necessary. The pulse rate and cardiac output increase. Vasoconstriction occurs in the vascular beds not concerned with heat loss, such as the splanchnic and renal beds.

Diathermy, as an efficient type of heater not only of superficial but also of deep tissues under most conditions, falls in the latter category. Because of the large amount of heat absorbed by the body, the mechanisms to maintain internal homeostasis are initiated. As a result, vascular changes which would increase the circulation to the heated area may be overshadowed by general vasomotor changes causing vasoconstriction in the same area. These changes, which are concerned with increasing the rate of heat loss from the body, dominate over vascular readjustments which would protect local areas. Although it is probable that during heating with diathermy there was some increase in the temperature of the kidney, any local response to heat was masked by the reflex vasoconstriction necessary to increase the cutaneous circulation. Likewise, in the studies of Kemp, Paul and Hines⁶ intense heating of the leg with short wave diathermy resulted in a decreased femoral blood flow. Reflexes to control general body temperature probably were initiated, and the blood was diverted to other areas to promote heat loss from the body.

Heating of the back with microwave diathermy likewise resulted in a large input of heat into the body, and reflex renal vasoconstriction resulted

12. Kottke, F. J.; Kubicke, W. G., and Laker, D. J.: Physical and Nervous Factors in Experimental Hypertension, *Arch. Phys. Med.* 28:146, 1947.

in the circulatory adjustment necessary to increase the cutaneous circulation. Although no measurements of cutaneous temperature or blood flow were made, flushing and sweating were observed and the patient had the sensation of increased warmth. Because of the smaller heat output of the Microtherm and the better localization of the heating, it is possible that during local heating of the leg of the dog reported by the Mayo Clinic group⁷ and the Iowa group⁸ the rate of absorption of heat was not great enough to cause general circulatory readjustments and consequently only the responses due to local heating were observed.

The importance of the rate of heat absorption in determining the effect of thermotherapy has often been overlooked. This is especially true with an efficient type of heating like diathermy. If the rate of heating is so great that the internal body temperature is changed, circulatory reflexes to increase heat dissipation may prevent the desired local response. Instead of an increase in local circulation there may be a decrease, in which case the treatment may cause the patient increased pain. This may account for the cases in which diathermy proves to be less effective than other types of heating in affording relief from pain. Microwave diathermy may provide a means under certain conditions for better localization of heating to avoid general circulatory readjustments. With all types of diathermy, caution should be observed against employing such large amounts of heat that general circulatory reflexes nullify the local effects desired.

Summary

Response of the renal circulation to heating with short wave diathermy and microwave diathermy was studied in healthy young adult subjects. Heat applied to the back by both types of diathermy resulted in a significant decrease of renal plasma flow and glomerular filtration without significant changes of blood pressure. Insofar as renal blood flow may represent the deep circulation, it appears that diathermy heating causes a decrease in deep blood flow. The factors in local and systemic circulatory responses to heating are considered.

Addendum

In accord with the suggestion of Dr. W. D. Paul in his discussion of this paper, a statistical analysis was made of the significance of changes of renal blood flow in response to heating the body with short wave diathermy or microwave diathermy (table 3). Each subject acted as his own control, and the experiments were analyzed so. In all experiments the mean renal blood flow was less during the period of heating with short wave or microwave diathermy than in the control period preceding heating. In eleven of the twelve experiments the mean filtration fraction was greater during the period of diathermy than during the control period. Determination of the probability, p , that the observed values fall within the expected distribution curve about the mean, showed that in four of the seven experiments in which patients were heated by short wave diathermy the decrease in blood flow was significantly greater than might be expected from random sampling. When the subjects were heated by microwave diathermy, in three of the five experiments the decrease in blood flow was greater than might be expected from variations in random sampling. Analysis of the filtration fraction showed less clearcut changes. In only one of the seven experiments in which the subject was heated by short wave diathermy was the increase in filtration

TABLE 3. — Analysis of Significance of Change in Blood Flow Through the Human Kidney and Filtration Fraction in Response to Heating with Short Wave or Microwave Diathermy.

Patient	Renal Plasma Flow		<i>p</i> *	Filtration Fraction		<i>p</i> *
	Control Cc./Min.	Diathermy Cc./Min.		Control Per Cent	Diathermy Per Cent	
Short Wave Diathermy						
1	830 ± 76	611 ± 11	0.044	17.4 ± 0.8	17.8 ± 0.2	>0.600
2	602 ± 37	552 ± 82	>0.600	19.3 ± 0.2	20.9 ± 0.8	0.504
3	747 ± 25	550 ± 46	0.005	20.2 ± 0.3	25.7 ± 0.2	<0.001
4	742 ± 55	509 ± 23	0.003	18.4 ± 0.3	19.7 ± 0.7	0.105
5	812 ± 42	664 ± 54	0.084	16.2 ± 0.2	17.4 ± 0.5	0.095
6	713 ± 38	469 ± 9	0.010	17.8 ± 0.04	20.5 ± 1.1	0.053
7	783 ± 23	723 ± 63	0.403	18.5 ± 0.4	20.8 ± 1.0	0.068
Microwave Diathermy						
1	798 ± 34	597 ± 17	0.006	16.9 ± 0.4	20.9 ± 0.0	0.002
2	734 ± 57	544 ± 22	0.036	23.0 ± 0.5	29.1 ± 1.3	0.012
3	743 ± 82	687 ± 6	0.535	17.0 ± 0.5	16.1 ± 0.5	0.246
4	655 ± 45	426 ± 6	0.007	19.9 ± 0.5	27.6 ± 0.4	<0.001
5	1176 ± 198	899 ± 24	0.256	17.1 ± 0.4	19.0 ± 0.5	0.058

* p = probability that observed value falls within the normal range of distribution according to "student's" t distribution for small series. Values less than 0.05 are considered biologically significant.

fraction beyond the probable limits of the distribution curve. When heating was by microwave diathermy, three of the five experiments showed an increase in filtration fraction beyond the probable range of normal.

Discussion

Dr. William D. Paul (Iowa City): As a whole, this is an excellent paper. The authors are to be commended for the techniques that they used. The uses of paraaminohippurate and of sodium thiosulfate to measure renal plasma flow (RPF) and glomerular filtration (GF) are reliable, proved methods. The authors observed the necessary precautions in rinsing the bladder several times after each determination and corrected the values to the standard area, 1.73 square meters.

However, I was somewhat perturbed by their handling of the data, inasmuch as no statistical analysis was made. It should be pointed out that any comparison of final values on the basis of filtration fraction is extremely risky. This is true because a small increase in the renal plasma flow which coincides with a slight decrease in glomerular filtration as measured by the experimental methods used will produce a large difference in filtration fraction, inasmuch as the filtration fraction is obtained by dividing the glomerular filtration by the renal plasma flow.

I have made a cursory analysis of the results in the tables, assuming that each figure represents the average of two experiments. Using the formula

$$\sigma = \sqrt{\frac{\sum x^2}{N}}$$

I obtained the following results:

Short Wave Diathermy

Control

Mean RPF = 747 ± 70.2
Mean GF = 136 ± 11.5

First 20 minutes

Mean RPF = 690 ± 144
Mean GF = 136 ± 31

Second 20 minutes

Mean RPF = 549 ± 68
Mean GF = 115 ± 18

Control

Mean RPF = 597 ± 106
Mean GF = 122 ± 14.3

Microtherm

Control

Mean RPF = 821 ± 175
Mean GF = 153 ± 30

First 20 minutes

Mean RPF = 640 ± 141
Mean GF = 132 ± 23

Second 20 minutes

Mean RPF = 620 ± 154
Mean GF = 135 ± 24

Control

Mean RPF = 782 ± 230
Mean GF = 151 ± 27

When such a short analysis as this is made, it will be noted that there is no statistically significant change whatever in glomerular filtration and that the differences in renal plasma flow show only a slight tendency to decrease.

I should like, however, to point out one extremely important result of this investigation: The figures prove conclusively that there is no increase in renal plasma flow

due to heating with short wave diathermy or with microwave diathermy.

Recently I have shown that both short wave diathermy and microtherm (12.5 cm.) resulted in similar temperature rise gradients. Both forms of high frequency currents caused a greater rise on the surface and in the subcutaneous tissue than at depths of 1.5 and 3.0 cm. below the surface. This probably explains why the authors obtained the same results with both short wave and microwave diathermy.

Again I want to stress the fact that when heat is applied to the surface there is, first, vasodilation on the surface and, second, absence of change or presence of vasoconstriction in the deep vessels. Studies such as those reported by the authors will do much to enhance our knowledge of the effect of heat.

Dr. Julia F. Herrick (Rochester, Minn.): Having measured blood flow for a good many years, I am particularly interested in this paper. I must raise a question, because I am not convinced that application of heat to the skin of a person necessarily raises the temperature of the kidney. I should like to know whether the kidney really did get heated and how much.

Dr. Kottke (closing): The question which Dr. Herrick raises is a good one. We have not measured the temperature of

the kidney in these normal adults, because most people object to having a thermocouple thrust into their kidneys, in addition to the other unpleasant procedures which had to be done in the process of carrying out this experiment.

We have only inferred the rise of temperature which might be obtained by comparisons with experiments which have been done on animals or on the thigh muscles of human beings.

The kidney of the average lean young adult is probably, 4 or 5 cm. below the surface of the skin. We know that in the thigh muscle of man at the depth of 4 cm. there is a considerable increase in temperature. We know that in dogs at the center of the liver, where there is a large blood flow, an increase in temperature of 2 to 4 degrees centigrade has been observed.

The spleen and lung of the dog can be heated by diathermy; the myocardium can be heated as much as 3 degrees centigrade when heat is applied to the surface of the body. With this in mind, I think it was fair to assume that we actually did have some increase in renal temperature. Now Dr. Osborne and Dr. Bierman inform me that they have measured the temperature of the kidney after heating with diathermy and have found that it is increased.

CHANGES IN JOINT TEMPERATURE PRODUCED BY DISEASES AND BY PHYSICAL THERAPY *

Preliminary Report

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and

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A relatively simple method of obtaining intra-articular temperatures has been devised as a means of determining the effect of various modalities of physical therapy on the joint and perhaps also for determining the amount of synovial hyperemia from a disease process. Increased heat in a joint after exercise may be an indication of the amount of cartilaginous degeneration present within the joint. Subnormal temperatures within a joint as compared with the skin temperature may be indicative of decreased circulation of the synovial membrane.

Method

Joint aspiration was performed in normal and in arthritic joints. Because of the ease of approach the knee joint was the usual site of study. Studies have also been made on the

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* Read in part at the meeting of the American Rheumatism Association, Chicago, June 20, 1948, and at the Twenty-Sixth Annual Session of the American Congress of Physical Medicine, Washington, D. C., Sept. 8, 1948.

elbow and ankle joints. An elastic bandage was applied to the knee joint, leaving an elliptic opening at the chosen site of aspiration in order to compress all available synovial fluid into that portion of the joint space into which the needle was to be inserted. The skin was sterilized with an antiseptic solution. The skin and synovium at a point $\frac{1}{2}$ inch medial to the medial border of the patella was infiltrated with several cubic centimeters of 1 per cent procaine solution. A 19 gauge needle was inserted through the synovial membrane into the joint space under the patella. A fine copper-constantan thermocouple or a thermistor was threaded through the needle to a depth of several inches in order to project into the joint space. The needle then was either left in place or, more frequently, removed leaving the recording device in place. The electromotive force developed by the thermocouples was measured by a potentiometer. The resistance of the thermistor was measured with a Wheatstone bridge. Thermocouples were also fixed on the skin overlying the patella, and in most cases a thermocouple was also placed on the skin of the opposite knee. If a therapeutic procedure was employed to modify joint temperature which prevented leaving the metal thermocouple in place, the thermocouple was removed and another aspiration was made immediately after the treatment.

Results

Forty-two determinations of the internal temperature of the knee joint and the overlying skin surface have been obtained on 35 persons. Four of these were essentially normal (i. e., nonpathologic except for age changes), and the rest disclosed some pathologic abnormalities affecting the joints, but with varying degrees of clinical activity. Two determinations were made of the elbow joint temperature in 1 patient with rheumatoid arthritis. The highest joint temperature in active rheumatoid arthritis was 99.3 F., and the highest skin temperature was 96 F. Normal joint temperatures varied from 89 to 91 F. In no instance in this series was the rectal temperature elevated at the time of study.

There was a remarkable correlation of resting joint temperature with relative clinical activity in rheumatoid arthritis. A fairly high correlation of clinical activity and surface temperature was obtained, but there were several instances in which the surface temperature was higher than the intra-articular temperature.

Observations were made on pain sensitivity of the synovium and joint capsule during these studies. If the synovium was touched at any point that had not been previously made insensitive with procaine, it was quite tender. The articular cartilage, however, seemed entirely insensitive even though touched or accidentally partially penetrated by the aspirating needle or tip of the thermocouple. If the thermocouple was pushed far enough to touch the synovium on the opposite side of the patella, a sharp pain was produced.

A variety of physical measures were employed to modify the joint temperature. Simple passive and non-weight-bearing active movement of the joint was performed in instances. In 4 cases, moderate elevation of intra-articular temperature was observed (0.6 to 2.5 degrees, mean 1.4 F. degree F.). In 1 case, no temperature change was observed after passive motion, and in another a slight fall was noted. When the joint temperature studies were performed after periods of exercise, the initial temperature showed varying degrees of elevation with rapid cooling on rest. Further work on this phenomenon is being carried out.

Fever therapy, induced by a pyrogen injected intravenously, resulted in increased joint and surface temperatures. When the rectal temperature was elevated to 100 F., an internal temperature of 101 F., an increase of 5.2 degrees, and a skin temperature of 99.4 F., representing an increase of 8.3 degrees, were noted. On another occasion, with a rectal temperature of 105.2

F., a joint temperature of 97.1 F. was obtained, but at this time the patient was being cooled by application of ice bags to the thighs. Even in these circumstances, the knee joint temperature was elevated 2 degrees F. over the normal control observation.

Application of an infrared heat source (baker) over the lower extremities for periods of thirty minutes resulted in slightly elevated joint temperatures.

Short wave diathermy (induction method, three turns of the coil around the joint), in patients who were able to tolerate this mode of therapy, produced elevated temperatures. The surface temperatures were elevated to a greater extent than the deep temperatures. A mean increase of 7.7 degrees in the joint and of 9.8 degrees on the surface was observed. A microwave diathermy apparatus was employed in 9 patients. There was a greater elevation of the internal temperature than of the surface temperature, confirming the previous observations of Horvath and co-workers on the heating of muscular tissues. Four tests employing the large 6 inch director gave the following mean increases: joint temperature 7.3 and surface temperature 5.6 degrees F. Similar gradients, but of smaller absolute magnitude, were observed when the smaller directors were employed.

Observations were made on the influence of hot and cold packs on both normal and inflamed joints. The application of hot packs invariably resulted in a depression of the intra-articular temperature as much as 2.2 degrees F. Continued reapplication of these hot packs produced steadily diminishing effects, but even after the tenth pack of a series the joint temperature was still definitely lowered. The internal temperature quickly returned to control levels after discontinuation, and five to ten minutes later the values were slightly higher — a positive reflex effect. Cold packs, on the other hand, increased joint temperatures to a corresponding degree. A reflex effect in the same direction was observed in the opposite knee joint in 1 patient so studied (i. e., depression of internal joint temperature with heat and elevation with external cold to the opposite knee). The effects of this mode of physical therapy on joint temperature were not so marked in the summer as in the winter.

Application of paraffin to the extremities caused a sharp rise of skin temperature over the joint with a delayed but marked rise in the temperature inside the joint. The effects of hydrotherapy on joint temperature were not pronounced, even though the skin temperature was increased rather definitely.

Studies are being carried out on the effect of exercise, particularly weight-bearing exercise, on the temperature within the joint. The rate of cooling on rest following activity may shed some light on the clinical phenomenon of the "friction effect" and "articular jelling" so commonly found in degenerative joint disease.

Summary

Classification of heating modalities by their effect on joint temperature is now possible. This method of determining temperatures may also prove to be a means of measuring the efficiency of circulation in the synovial membrane. It has not yet been shown that raising the joint temperature in treating arthritis is necessarily beneficial; in fact, in cases of active arthritis the forms of physical therapy which raise the temperature most (i. e., short wave diathermy, microwave and paraffin applications) clinically appear to aggravate pain in the acutely involved joints. It is interesting that cold, pain, fear and even smoking all lower the skin temperature and raise the joint temperature appreciably. Reevaluations of modalities of physical therapy

chosen for treatment in rheumatoid arthritis should be made with the actual reaction of the joint in mind rather on purely surface temperature changes, since it has been observed in this work that the changes in joint circulation do not parallel those in skin but frequently are directly opposite.

Discussion

Dr. Howard F. Polley (Rochester, Minn.): Dr. Horvath and Dr. Hollander have ingeniously applied biophysical methods to the study of intra-articular temperature. Their technique warrants careful study, and their studies are deserving of confirmation and extension.

Analysis of their data suggests that there is a consistent gradient between skin temperature and intra-articular temperature, the former averaging about 2 degrees F. lower than the latter. This temperature relationship is of the same order as that established by Herrick and her associates in their pioneer work on effects of microwaves on the skin temperature and muscle temperature in studies on both animals and human subjects.

The data of Dr. Horvath and Dr. Hollander show that the average thermal gradient is well maintained throughout the degrees of clinically measured activity of rheumatoid arthritis. Failure of this rather consistent thermal relationship to be maintained when hot or cold packs were applied is one aspect of this valuable study needing further clarification.

Although effort was presumably made to control as many known factors as possible, the finding of variable responses to physical agents in the same patient at different seasons of the year reflects the potentialities for misinterpretation of results. Vasomotor stability and circulation are notoriously labile in rheumatoid arthritis, and there are notable variations in the course of the disease from time to time. One wonders whether study in a room with constant temperature and humidity would not minimize such discrepancies.

The age of the normal subjects was from 35 through 42 years. Were these subjects men or women? What was the age and sex distribution of patients with rheumatoid arthritis? I should like also to inquire the age and sex of the patients with osteoarthritis and the extent of their disease

symptomatically as well as roentgenographically.

Differences in intra-articular temperatures in rheumatoid arthritis and osteoarthritis were attributed to variations in circulation and a "friction effect." We must not overlook the fact that cartilage may be destroyed in rheumatoid arthritis. In so-called inactive rheumatoid arthritis the findings of damaged cartilage, negligible synovial effusion and minimal degrees of synovial inflammation may be analogous functionally to primary osteoarthritis. The longer time required for the establishment of basal intra-articular temperatures in osteoarthritic joints was thought due not only to the "friction effect" but also to decreased circulation in such joints; however, the opinion was also expressed that elevation of articular temperature resulting from periods of active exercise showed "rapid cooling on rest." Further definitive information is needed to explain adequately the differences between intra-articular temperatures in osteoarthritis and rheumatoid arthritis.

The studies of Dr. Horvath and Dr. Hollander have involved numerous physical methods of influencing *in vivo* temperatures. Their observations are interesting and chart the course of future study necessary before final interpretation of these data can be satisfactorily explained and understood. Much work obviously remains to be done in collecting more and detailed data for the various methods of physical treatment.

Although their apparatus may have appeared extensive, their stimulating approach to the study of a phase of articular physiology is well within the scope of physiatrists interested in objective evaluation of physical therapy of articular disease. Further results will be anticipated with interest and will surely ultimately improve our therapeutic approach to the various types of arthritis.



REHABILITATION OF THE CHRONIC MEDICALLY ILL

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Patients with chronic medical conditions, especially those in the older age groups, are frequently considered as candidates for custodial care only and left untreated for long periods. In the past it was thought that these people were incurable and that therefore treatment would involve time, personnel and expense which could be more profitably employed in cases of acute and subacute diseases. Recent statistics show that since the beginning of the century the average life expectancy has increased from 49 to 66.5 years. Morbidity and invalidism increase noticeably after age 50, and therefore it is obvious that the problem of caring for these people must be reevaluated.¹ Techniques aiming at rehabilitation not only should be used in the early phases of disease but should be emphasized equally when definitive treatment is no longer of great consequence.² In the present study, involving 128 patients with chronic medical diseases referred to the physical medicine rehabilitation service of the Manhattan Beach Veterans Administration Hospital in 1947, it is clearly shown that favorable results can be obtained, at least to some extent, no matter how great the disability or how poor the prognosis.

In this hospital the physical medicine rehabilitation service is set up along the lines approved by the Veterans Administration.³ It consists of five essential units: physical therapy, occupational therapy, corrective therapy, educational therapy and manual arts therapy. Thus the patient can be guided from the actual treatment of his initial disability to instruction in self care, ordinary locomotion and special locomotion, such as stair climbing and descending stairs and curbs. Educational therapy stresses special speech classes for aphasic patients, reading, writing and other academic subjects; in the last named group the emphasis is on social and possible reemployment objectives. In manual arts therapy, shop subjects are taught from the same point of view. The entire program is continuous and overlapping, in order that the patient's interest in the curriculum is maintained. In addition, the Rehabilitation Board is convened frequently for consideration of the cases of severely disabled patients. This Board consists of the physiatrist, who is chairman, and representatives of the various units of the physical medicine rehabilitation service who are assigned to the patient, the ward physician who referred the patient, the psychiatrist, the social worker and a vocational guidance adviser. The social worker is especially important to the patient's future, laying the ground work for final readjustment to his home, family and job.

Project A

One hundred and twenty-eight unselected medical patients who had been referred en masse to the physical medicine rehabilitation service after transfer from other hospitals, where they had been for periods ranging from a few months to ten years, were used as the basis for this study. Their average

1. Boas, E. P.: Chronic Diseases, M. Addenda, Stud. New York Acad. Med., pp. 127-156, 1947.

2. Rusk, H. A.: Rehabilitation and Convalescence, Third Phase of Medical Care, M. Addenda, Stud. New York Acad. Med., pp. 103-126, 1947.

3. Knudson, A. B. C.: Activities of Veterans Administration in Rehabilitation, Occup. Therapy 25:191, 1946. Covalt, D. A.: Physical Medicine and Rehabilitation in the Veterans Administration, Arch. Phys. Med. 28:327, 1947.

was 55 years. They were treated individually and studied intensively from Jan. 1 to Dec. 31, 1947. A battery of one hundred tests, including simple tasks such as washing the face and traveling in common conveyances, was used to determine the percentage of self care attained. In table 1 the per-

TABLE 1. — *Progress in Self Care of 116 Patients.*

Number of Patients	Percentage of Self Care	
	Initial	Final
49	0	100
13	0	75
18	0	50
3	0	25
1	25	100
5	50	100
19	75	100
5	25	50
3	50	75

116 (74 patients, 64 per cent, discharged from the hospital)

centage of self care attained by all the treated patients is indicated. Of the 128 patients, 116, or 90.9 per cent, attained from 50 to 100 per cent self care, and 74, or 64 per cent, were discharged from the hospital. In the six months following the period of the original study, 14 additional patients were discharged and only 2 were readmitted; these readmissions were not primarily for the original physical disabilities.

An attempt was made to determine the amount of improvement attained by patients with particular diseases. Of 28 patients with rheumatoid arthritis (table 2), 23 attained 50 per cent or more self care; 1 patient attained

TABLE 2. — *Improvement in Patients with Chronic Arthritis.*

Number of Patients	Percentage of Self Care	
	Initial	Final
1	0	60
1	0	25
2	25	50
2	50	75
1	50	100
17	75	100
4	No benefit	
28		

only 25 per cent improvement, but this enabled him to care for himself with a minimum of assistance from special attendants. Four patients did not derive any benefits. The average length of treatment for maximal benefit was three months. Of 10 patients with multiple sclerosis (table 3), 7 attained

TABLE 3. — *Improvement in Patients with Multiple Sclerosis*

Number of Patients	Percentage of Self Care	
	Initial	Final
1	0	25
2	0	50
1	0	75
1	50	75
3	50	100
2	No benefit	
10		

50 per cent or more self care, 1 attained 75 per cent self care and only 2 derived no benefit. The average length of treatment for maximal benefit was four and a half months. Nine patients had Parkinson's disease; of these, 3 went from 0 to 75 per cent self care; 4 went from 0 to 50 per cent self care, and 2 received no benefit from the treatment. The average length of treatment for maximal benefit was five months.

In table 4 the gains made by 32 hemiplegic patients, practically all of whom also had severe arterial hypertension and cardiac disease are shown; the ages varied from 55 to 65 years. The average length of treatment for maximal benefit was four months. Of three paraplegic patients 1, with neurofibromatosis, attained 100 per cent self care; 1, with transverse myelitis, attained 50 per cent self care, and 1 showed no improvement. The average length of treatment for maximal benefit was eight months. Two patients

TABLE 4. — *Improvement in Patients with Hemiplegia.*

Number of Patients	Percentage of Self Care	
	Initial	Final
11	0	100
4	0	75
7	0	50
1	0	25
1	25	100
3	25	50
1	50	100
2	75	100
2	No benefit	
32		

had severe B rger's disease (both single amputees) which had hospitalized them for two years; 1 attained 100 per cent and the other 50 per cent self care. The average length of treatment for maximal benefit was three months. Two patients with peripheral arteriosclerosis obliterans of the lower extremities (both single amputees) attained 100 per cent self care. The average length of treatment for maximal benefit was one and one-half months.

The remaining 43 patients were all medical invalids with a variety of diseases, chiefly cardiac conditions, asthma, diabetic gangrene, central system syphilis, cirrhosis of the liver and muscular dystrophies and atrophies. Of this group, 34 patients progressed from 0 to 100 per cent self care; 4 progressed from 0 to 75 per cent and 3 progressed from 0 to 50 per cent; 1 patient received no benefit. The average length of treatment for maximal benefit was three months.

A small group of 12 patients did not receive any benefit from this program; of these, 4 had arthritis, 2 had Parkinson's disease, 2 had multiple sclerosis, 2 were hemiplegic, 1 had muscular dystrophy and 1 was paraplegic. The cases of these patients must be considered the true treatment failures. It should be emphasized that there is bound to be a certain amount of failure (9.1 per cent in this series) because of the poor prognosis in practically all such cases.

Project B

To determine the comparative value of rehabilitation, results in a group of 7 hemiplegic patients treated in this rehabilitation service were compared with those in another group of patients within the same age group and with similar disabilities who did not receive the physical medicine rehabilitation

program. The control group was selected from records of other hospitals. The average length of hospitalization of patients not receiving this program was 6 years; all these patients are still undergoing treatment (table 5). The average length of treatment of patients with similar types of disease receiving the rehabilitation treatment was 8.43 months.

TABLE 5. — *Comparative Lengths of Hospitalization of Hemiplegic Patients With and Without Rehabilitation Program.*

Patient	Hospitalization	
	Admission	Discharge
Treated Group		
A	1/1/47	1/1/48
B	6/26/46	6/19/47
C	12/1/46	6/2/47
D	2/1/47	8/25/47
E	6/26/46	9/10/47
F	4/17/47	7/22/47
G	8/11/47	1/19/48
Control Group*		
H	1936	
I	1946	
J	1938	
K	1945	
L	1942	
M	1941	
N	1946	

* These patients were still hospitalized at the time of this report.

TABLE 6. — *Hospitalization of Hemiplegic Patients Before and After Rehabilitation Program.*

Patient	Admitted to VA Hospital	Admitted to Rehabilitation Program	Discharged from VA Hospital
O	3/13/38	1/10/47	6/4/47
P	12/19/38	2/15/47	3/21/47
Q	3/1/45	1/16/47	4/1/47
R	3/15/45	1/8/47	1/23/47
S	10/21/41	1/8/47	5/21/47
T	10/30/45	3/7/47	9/3/47
U	5/27/46	7/2/47	9/11/47
V	7/5/45	3/3/47	9/12/47
W	7/25/47	8/2/47	10/8/47
X	2/19/47	7/27/47	10/24/47

Project C

In this project a comparison was made of the length of hospitalization of a group of hemiplegic patients before and after treatment in the physical medicine rehabilitation service. As may be seen from table 6, the hospital stay was shortened considerably after the program was instituted.

Comment

From this study it can be seen that over 90 per cent of these patients with chronic medical conditions were rehabilitated, at least to the extent that the amount of required attendant and nursing care was greatly reduced and ultimately to the point that most of them could go home. In this series, 64 per cent were discharged from the hospital. In the past, the patients' families were frequently informed that the prognosis was hopeless and that the patients had become more or less custodial problems. Little or no treatment was instituted, and this led to increasing apathy, loss of morale and

lack of desire on the part of the patients to improve. Frequently their limbs became fixed in useless positions, and bed sores developed. With the physical medicine rehabilitation program, this situation was changed to the extent that the wards became cheerful, the patients became more interested in life and the morale of the medical staff improved. The families were invariably delighted at the patients' improvement and subsequent discharge from the hospital.

In this connection, it appears that, in addition to the physical medicine rehabilitation program for inpatients, a good outpatient program is necessary to provide for continuity of treatment following discharge. With such a program many patients who in the past had to remain in the hospital would be enabled to go home much earlier. Transportation should be provided to facilitate treatment in the outpatient department.⁴

Common sense, ingenuity and perseverance are necessary in the treatment of patients with chronic conditions.⁵ The physician in charge must at all times maintain an attitude of optimism, which will, in turn, be communicated to the patients. Each case presents individual problems. In one case, a patient with bilateral cerebral thrombosis, who had been bedridden for many years, received the necessary amount of muscle reeducation and strengthening but was unable to stand because of a marked tendency to fall backward. This was counteracted by increasing the height of his heels, so that the center of gravity was shifted forward. Later, when the patient acquired good equilibrium and muscular control, the heels were lowered gradually until they were of normal height.

A group of trained therapists working under the direction of the physiatrist is extremely essential. There must be close collaboration among the various members of the group. Each patient must be treated individually. It is the details in diagnosis, details in medical and surgical care and details involved in the physical medicine rehabilitation program which are essential to produce the best ultimate results. Finally, rehabilitation of patients with chronic conditions should be undertaken without consideration of the length of their previous hospitalizations or the ultimate prognosis of the disease.

Summary

1. Rehabilitation is of primary benefit to patients with chronic medical diseases, as indicated by improvement of 90.9 per cent of the patients in a series of 128 and discharge of 74 per cent.
2. Nursing and attendant care is reduced, and hospital beds may be released for other patients.
3. Patients can take care of themselves for the remaining years of their lives and reacquire a certain amount of independence.
4. The families, in turn, feel that the patients are not necessarily hopeless invalids and welcome their improvement.

4. Crosland, J. H.: *Rehabilitation of the Aged Sick*, M. Press 218:121, 1947.

5. Elkins, E. C.: *Physical Rehabilitation of the Severely Handicapped*, J. Kansas M. Soc. 48:57, 1947.



THE PREVENTION OF POSTURAL DEFORMITY AFTER THORACOPLASTY *

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Thoracoplasty is the most efficient means of effecting permanent collapse of the lung in advanced pulmonary tuberculosis with cavity. This operation, usually carried out in multiple stages, entails the removal of several ribs and their adjacent transverse processes on one side of the chest. The removal of these bones detaches important muscular structures from their normal sites of insertion, thus disturbing their function in maintaining normal lateral stability of the spine. The imbalance thus produced initiates the development of a marked postural deformity, which, if unchecked by treatment, grows progressively worse.

My purpose in instituting a posture program at this Veterans Administration Hospital was to attempt to prevent or minimize the marked postural deformity that follows thoracoplasty. This program was prompted by the numerous complaints registered by patients who, having had the operation elsewhere, were admitted here because of recurrent disease. Their deformities were usually severe. They complained of pain in the chest, limited range of motion in the shoulder, awkward appearance and difficulty with wearing clothing. Since marked postural deformity creates social and vocational handicaps superimposed upon those created by tuberculosis, it is apparent that it is necessary, wherever possible, to minimize such deformity.

It is generally recognized that good posture is associated with good health and poor posture with poor health. The maintenance of good posture depends upon several factors, one among which is habit. Unnatural postural attitudes assumed for long periods, day in and day out, whether while standing, sitting or lying down, may lead to abnormalities which later become permanent. This results, perhaps, from the development of conditioned reflexes, the postural muscles becoming conditioned to the abnormal attitude. Another factor in poor posture can be muscular imbalance. This is probably the major cause of the deformity in posture occurring after thoracoplasty.

A posture survey of an unselected group of ambulatory patients revealed that at least 40 per cent of them showed some abnormality of posture when compared with accepted normal standards. Recognizing the association of good posture with good health and the importance of hygienic measures in the treatment of pulmonary tuberculosis, it was felt that measures directed toward improving posture might be of some benefit in the over-all treatment of the disease.

Two Phases

The posture program in this hospital is divided into two phases. The first of these deals with all patients; the second, with those having thoracoplasty. In the early stages of treatment patients spend many long weeks at complete bed rest. They often lie in bed with one or more pillows causing constant forward flexion of the head. When such a patient becomes ambula-

* Read at the Twenty-Sixth Annual Session of the American Congress of Physical Medicine, Washington, D. C., Sept. 8, 1948.

tory, he may become conditioned to this postural attitude and demonstrate a round shouldered posture. Prolonged reclining on a soft bed in the supine position leads to strain of the lumbar muscles. To prevent postural abnormalities in such patients, they are instructed to lie flat in bed without pillows during the organized rest periods each day. To insure further relaxation, the knees can be flexed and the patient's pillow placed under the knees. A rolled-up towel under the lumbar curve relieves this strain.

When the patient becomes ambulatory, his standing posture is analyzed and abnormalities detected by the physical therapist. Advice for correction is given. During his entire hospitalization, the patient is reminded of the importance of posture. Large posture mirrors are located on all floors opposite the patient elevators. These carry posters with hints on how to attain good posture. Posture mirrors are also located in all patient lavatories and shower rooms.

The second phase of the posture program deals with the prevention of postural deformities after thoracoplasty. Review of the early postoperative

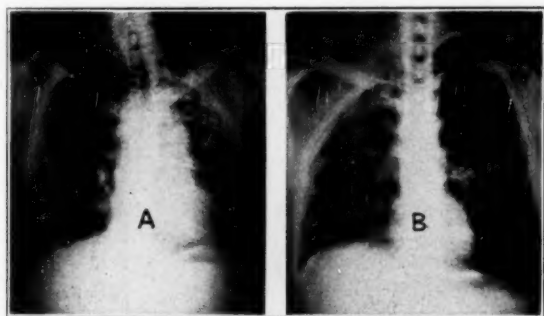


Fig. 1. — *A*, early development of deformity after first stage of operation. *B*, prevention of deformity by early employment of corrective measures.

films of those patients admitted with already marked deformities of the spine reveals that the deformity begins to develop within a few days after the removal of the first two or three ribs in the first stage of the operation (fig. 1*A*). Therefore, measures employed to prevent deformity must be instituted early. That early tendency to deformity may be prevented can be demonstrated roentgenologically (fig. 1*B*).

The Problem

In developing a procedure for the prevention of spinal deformity, it was assumed that a delicate interplay of balanced musculature on each side of the spine determines the maintenance of lateral stability in the normal straight spin. Interference with the function of the spinal muscles, such as occurs with thoracoplasty, creates an imbalance and allows unopposed pull of muscles on the unoperated side to initiate lateral flexion toward that side in the cervicothoracic region. Thus, the convexity of the curve is directed toward the side operated on. With this there follows an elevation of the shoulder on the treated side, with a shift of the scapula forward. The latter may explain the shoulder disability occurring after the deformity. Later, a compensatory lumbar curve develops, with elevation of the pelvis and shortening of the quadratus muscles on the side operated on. With no preventive

measures, all curves grow progressively worse and become fixed deformities (fig. 2).

A procedure to prevent postural deformity after thoracoplasty must take into consideration the importance of rest in the treatment of the underlying disease. Hence, passive measures are preferable, for the most part, to minimize exertion on the part of the patient.

The patient who is to have a thoracoplasty is visited by the physical therapist preoperatively. She orients him as to the importance and aims of the procedure. He is advised to develop the "feel" of a straight spine while lying on his back in bed and assisted in assuming the position correctly. In general, he should lie on his back postoperatively for as long a period as is

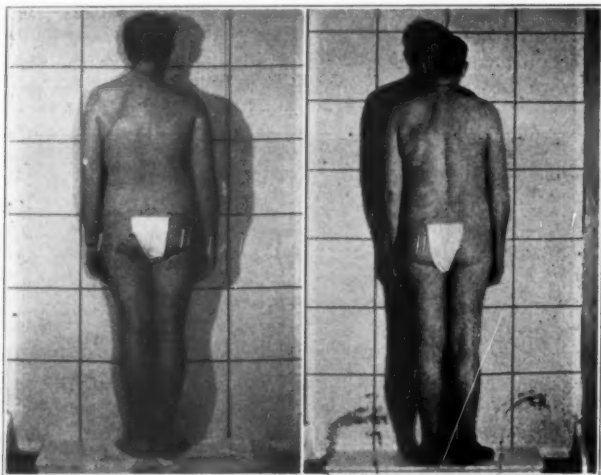


Fig. 2. -- Typical deformity after seven rib thoracoplasty; note elevated left shoulder.

Fig. 3. -- Postural deformity prevented after seven rib thoracoplasty.

consistent with his comfort. To counteract the tendency to lateral flexion in the cervicothoracic region toward the unoperated side, he is instructed to keep these flexors stretched by approximating the ear on the operated side to the shoulder on the same side. He routinely assumes this position while lying on his back, for two hours in the morning and two hours in the afternoon and as often in between time as is compatible with his comfort. To supplement these measures and also to prevent adaptive shortening of the elevators of the shoulder on the operated side, he is instructed to make voluntary attempts frequently to depress this shoulder directly downward.

Two or three days postoperatively, depending upon the patient's general condition, passive movement of the shoulder, especially in abduction, is carried out daily. This, after a few days, is followed by active movement.

After Care

When the patient is allowed to get up, with bathroom privileges, he is instructed to give attention to his standing posture. This he does by standing frequently for several minutes before a posture mirror. He makes an attempt to level his shoulders by depressing actively that on the side of the operation.

When he is able to come to the physical therapy department, his posture is checked by the physical therapist and encouragement given the patient.

All of these measures are carried out continually through all stages of the operation and several weeks after the last stage. Later the patient is instructed to correct his own posture before the mirror frequently to maintain what benefit he has gained. The latter measures apparently assist in conditioning the spinal musculature toward correct posture in spite of its unbalanced condition. Records of progress are kept by preoperative and periodic postoperative photographs of the patient's standing posture.

The results of this posture program have been very gratifying. That deformity is prevented or minimized can be demonstrated by the photographic records (fig. 3). The cosmetic effect of level shoulders coupled with the improved ability to fit his clothing better is appreciated by the patient. In all routine uncomplicated cases, shoulder motion has returned to normal range. There is the possibility that the better body mechanics occasioned by the improved posture might favorably affect the future course of the underlying tuberculosis. Since this program was started, in July, 1947, none of the patients treated with thoracoplasty and discharged as having quiescent or arrested disease have been readmitted with recurrent disease.

Discussion

Dr. Arthur M. Pruce (Atlanta, Ga.): Results of thoracoplasty in tuberculosis have usually been evaluated from two viewpoints: (1) survival and (2) sputum conversion. Dr. Treister has presented a third viewpoint stressing the importance of preserving the function of the shoulder girdle and the control of spinal deformity which invariably follows thoracoplasty for tuberculosis.

The traditional posterolateral paravertebral incision for thoracoplasty is made in the interscapular space just medial to the vertebral border and the lower angle of the scapula. The knife divides the trapezius, both rhomboids, a portion of the serratus anterior and the latissimus dorsi. The lateral recti spinae are stripped from the ribs, the three upper ribs clipped and removed. Second and third stages of thoracoplasty require that additional muscles be divided and more ribs be sacrificed to secure the permanent collapse of the lung. The devastating effect on muscle balance is readily seen. A program for prevention of deformity as outlined by Dr. Treister

has recently been established and is now routine in all Veterans Administration Hospitals.

Dr. Treister states that since the initiation of this program in July, 1947 there have been (quote) "no patients readmitted with recurrent disease." It would seem that we should withhold judgment as to the relation between the rehabilitated program and the actual relapse rate, since it is much too early to formulate a true opinion. It is further necessary to point out that, just as Dr. Treister himself was impressed by the postthoracoplasty patients, who were admitted to his hospital for a relapse, so it may be that some of his own patients treated under this program may well seek further care at other hospitals.

Therefore, since the best thoracoplasty statistics claim no more than 80 per cent success, it is apparent that either the present series is too small or the time too short for proper evaluation of this program.



CONTRIBUTION TO THE REHABILITATION OF QUADRIPLÉGIC PATIENTS *

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and

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During recent years a great number of special devices have been developed to permit or increase the usefulness of paralyzed hands, so to enable patients to enjoy greater independence in their activities. Most of these are devices designed for routine activities of daily life, such as holders for eating utensils, cigarettes and tooth brushes;¹ some may increase the earning power of the paralyzed, such as appliances for typing;² some are modifications of tools and equipment designed for therapeutic purposes, allowing the patient to partake in occupational therapy at a time when his hands are too weak to use ordinary tools;³ other devices, such as automobile-driving appliances, may even be objectionable, since they permit the severely paralyzed to perform an activity which, though enjoyable, may be dangerous to him and others.

The vocational choices of quadriplegic patients are very limited. Photography could be one of the few feasible ones provided that the patient has some use of his arms; partial use of the fingers would be an added asset. There are limitations to the type of photographic work that a person with quadriplegia can do; portrait work seems most suitable. Some finger function is necessary for darkroom work. In the case to be reported the patient was interested in studying photography on a vocational basis, but because of his disability he was unable to hold and manipulate a standard camera used for professional photography. To meet his need, a wheelchair camera mount⁴ was designed and constructed by the patient and his manual arts therapist.

Report of a Case

E. P., a 25 year old veteran who was injured in a parachute landing, sustained a compression fracture of the fifth cervical vertebra, followed by immediate quadriplegia. His hospitalization was marked by appearance of numerous decubitus ulcers, spasms, pneumonia and many episodes of urinary infections. There was a gradual incomplete return of "spotty" sensory function, but motor power did not return. The quadriplegia is now manifested by complete paralysis of the lower extremities and partial paralysis of the upper extremities. The severe disability of the arms and the complete loss of motor function in both hands is shown in the results of the muscle examination (fig. 1).

Apparatus

For use of this patient a wheelchair camera mount (fig. 2A) was designed which places the camera at proper eye height. Its head pan gives all the

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¹ From Cushing Veterans Administration Hospital, Framingham, Mass. Mr. Owens is Chief of Manual Arts Therapy, Mr. Cabo a member of the Department of Manual Arts Therapy and Dr. Friedland, Chief of the Physical Medicine Rehabilitation Service.

1. (a) Clark, M. D.; McGovern, J. P., and Lee, W. J.: "Self-Help Aid" in the Rehabilitation of the Quadriplegic Patient, *Occup. Therapy* 27:167 (June) 1948. (b) Gingras, G., and Hardy, G.: Occupational Therapy and Quadriplegia, *Occup. Therapy* 27:159 (June) 1948. (c) Haas, L. J.: Eating with One Hand, *Occup. Therapy* 25:233 (Dec.) 1946.

2. Haas, L. J.: Typewriting with One Hand, *Occup. Therapy* 27:121 (April) 1948. Gingras and Hardy, ib.

3. Licht, S.: Modifications of Tools and Activities in Kinetic Occupational Therapy, *Occup. Therapy* 26:240 (Aug.) 1947.

MUSCLE EXAMINATION									
LEFT		EXAMINER'S INITIALS		RIGHT					
		DATE		DATE					
SCAPULA		N	Abductor — serratus anterior	N					SCAPULA
		N	Adductor — middle trapezius	N					
		N	Adductor — Rhomboids	N					
		N	Flexor	N					
		N	Depressor	N					
SHOULDER		N	Flexor	N					SHOULDER
		N	Extensor	N					
		N	Abductor	N					
		N	Horizontal Abductor	N					
		N	Horizontal Adductor	N					
ELBOW		N	Extensor	N					ELBOW
		N	Flexor	N					
FOREARM		N	Supinator	N					FOREARM
		N	Pronator	N					
WRIST		O	Flexor — radial deviation	O					WRIST
		O	Flexor — ulnar deviation	O					
		N	Extensor — radial deviation	N					
		O	Extensor — ulnar deviation	O					
		O	Flexor — metacarpophalangeal	O					
FINGERS		O	Extensor — metacarpophalangeal	O					FINGERS
		O	Flexor — proximal interphalangeal	O					
		O	Flexor — distal interphalangeal	O					
		O	Abductor	O					
		O	Adductor	O					
THUMB		O	Opponent — 1st finger	O					THUMB
		O	Opponent	O					
		O	Flexor — metacarpophalangeal	O					
		O	Extensor — metacarpophalangeal	O					
		O	Flexor — interphalangeal	O					
		O	Extensor — interphalangeal	O					
		O	Abductor	O					
		O	Adductor	O					

Fig. 1. — Results of muscle examination.

versatility of the standard tripod mount, and, since the mount is a part of the wheelchair, additional mobility is obtained. The apparatus (fig. 2B) merely consists of a board clamped to the wheelchair arms and a tube mounted in the center of the board with an adjustable rod sliding inside the tube, locked by a thumb screw for height adjustment. The pan head, which allows

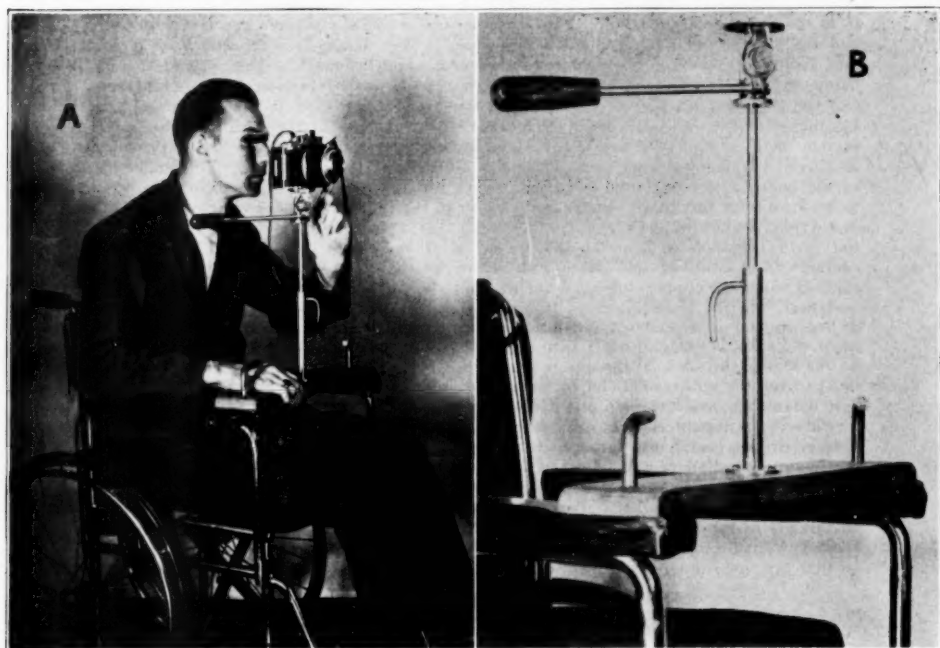


Fig. 2. — Wheelchair camera mount.

turning and tilting of the camera, is attached to the top of the adjustable rod, and the camera is attached to the pan head.

The necessary parts and the construction of this device are shown in figure 3.

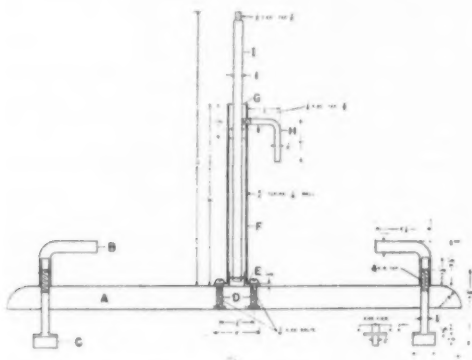


Fig. 3. — Details of construction of the camera mount.

A is a board 1 by 4 by $2\frac{1}{4}$ inches with $\frac{3}{8}$ inch hole at each end for clamps which fasten the board rigidly to wooden wheelchair arms, which are also drilled to receive the clamps. For other types of arms, the clamp arrangement must be drilled differently. B, the upper section of the clamp, is a $4\frac{1}{2}$ inch long section of $\frac{1}{2}$ inch cold-rolled rod, into one end of which a hole is drilled $1\frac{1}{4}$ inches deep to take a $5/16$ inch screw and threaded internally 18 threads to the inch; it is bent at a 90 degree angle $2\frac{1}{4}$ inches from the end. The bend is to enable patients with little or no finger function to loosen and tighten the clamp. C, the lower section of the clamp, is machined from a $3\frac{3}{4}$ inch length of 1 inch cold-rolled rod. A thumb screw is machined on one end; a $\frac{1}{2}$ flange of full 1 inch diameter is left to serve as a washer between the thumbscrew and the rod section; the rest of the rod is machined down to $5/16$ inch diameter, and $1\frac{1}{4}$ inches at the end is threaded 18 threads to the inch to fit the thread in the upper section of the clamp. D, bolts $\frac{1}{2}$ inch in diameter, with slotted round heads, threaded 20 threads to the inch, are used to attach the pedestal to the board. The underside of the board is counterbored $3/16$ inch to permit the nuts and the ends of the bolts to be flush with the lower side of the board. E, the brass flange for attachment to the board is 2 inches in diameter, $\frac{1}{8}$ inch thick, with bolt holes $1\frac{1}{2}$ inches on center; the vertical section is $\frac{5}{8}$ inch in diameter, $\frac{3}{4}$ inch high, with a $\frac{1}{2}$ inch hole in the center, and is soldered into place with silver solder. F, the tube section of the pedestal is made of copper tubing 8 inches long, $\frac{3}{4}$ inch in diameter and with a $1/16$ inch wall. G, the brass insert, is $1\frac{1}{2}$ inches long, $\frac{5}{8}$ inch in diameter with a 0.380 inch drilled opening; it is soldered into place with silver solder. H, the screw for adjustment of height is made of a $3\frac{3}{4}$ inch section of $\frac{1}{4}$ inch cold-rolled rod; a $\frac{1}{4}$ inch length at one end is threaded 20 threads to the inch. The rod is bent at a 90 degree angle 2 inches from the unthreaded end, to facilitate manipulation by a person with quadriplegia. The assembled pedestal section is drilled and threaded to accommodate this adjustment screw. If the mount is to be used by more than one patient, it is suggested that this hole be drilled completely through the pedestal section and that bolt holes be threaded to permit operation of the adjustment screw from either side, since quadriplegic patients vary as to the better hand. I, the adjustable rod is an 11 inch long section of $\frac{3}{8}$ inch diameter cold-rolled steel rod, machined down to $\frac{1}{4}$ inch diameter and threaded 20 threads to the inch for $\frac{3}{8}$ inch for attachment of the pan head. This rod is drilled for a $1/16$ inch pin, which is allowed to project $1/16$ inch on each side to act as a stop so that the rod cannot come out of the pedestal.

Summary

A wheelchair camera mount is described and illustrated; it is designed for use of quadriplegic patients who desire to engage in photography as a vocation or hobby.

AN EXERCISE GLOVE FOR QUADRIPLEGIAS *

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and

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The goal of physical rehabilitation in spinal cord injuries is the development of strength of the nonparalyzed muscle groups to such a degree that they will suffice for any compensatory action necessary for everyday activities and locomotion. The higher the spinal cord lesion, the more difficult it becomes to attain this goal. Therefore, the greatest obstacles are encountered in quadriplegics. Although there may be active motion present in the shoulder or even elbow joints, retraining of these muscle groups is difficult because of the loss of hand grip, which makes resistive exercises with bars, bells or pulleys impossible.

An exercise mitten (fig. 1), developed by one of us (H. R. S.), has facilitated

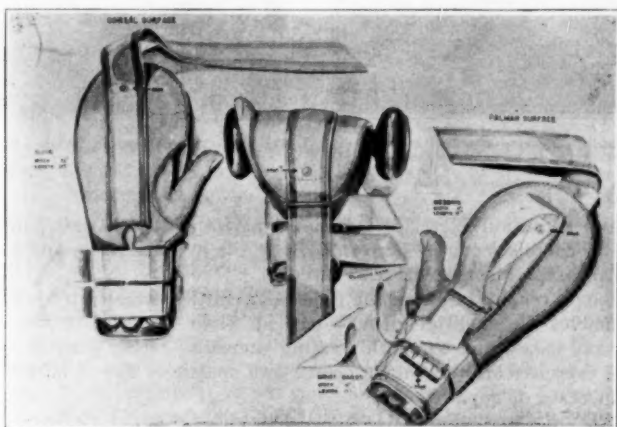


Fig. 1. — Dorsal and palmar surfaces of glove and (center) method of using glove to hold dumbbell.

tated the rehabilitation of quadriplegics by making possible exercises with bar bells, pulleys and dumbbells attached to the hand.

The glove is made of smoked horsehide of 1 ounce thickness. Three straps of drab webbing are used — one sewed to the palmar surface and used to attach the variety of bars to the glove and two about the wrist to secure the glove. One strap of elastic webbing is sewed onto the dorsum of the glove and is used to flex the fingers around the bars. The average width of the glove is $5\frac{1}{2}$ inches; the average length, $12\frac{1}{2}$ inches. The four straps are 17 inches long and $1\frac{1}{2}$ inches wide. Metal brads are used to reinforce the straps, and metal buckles are used to lock the straps. A gap in the leather prevents buckling of the leather over the dorsum of the wrist. These gloves are easily made and should be made to measurement for each quadriplegic.

* From the Paraplegic Service of Birmingham Veterans Administration Hospital.

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Each patient receives gradually increasing exercises up to forty-five minutes; the weights are also gradually increased according to the patient's tolerance. Flexion and extension, rotation and crisscross exercises can be performed from a supine position on the mat with the dumbbells (fig. 2);



Fig. 2. — Method of attaching dumbbell to glove; the strap of the left glove is partially tightened around the bar of the dumbbell; the fingers of the right hand have been flexed around the bar.

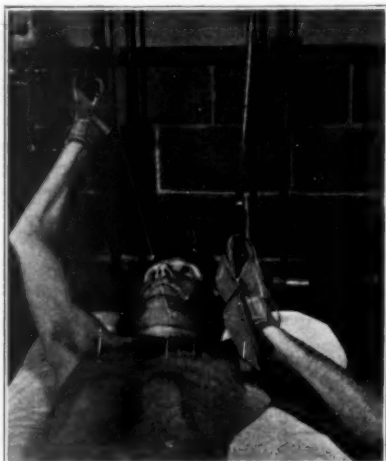


Fig. 3. — Gloved hand in action with wall pulleys.

flexion and extension exercises are shown performed with wall pulleys (fig. 3); pull-up exercises can be performed with the overhead bar, and prone exercises can be performed with the barbells.

Adequate rehabilitation of the upper extremities attained by use of these gloves enables the quadriplegic to wheel his chair, to get into and out of a car in many cases, and to use his eating utensils. Other general beneficial effects of exercises are the known decrease of spasticity due to muscle fatigue and an increase of appetite.

Summary

A glove is described which can be used by quadriplegics to facilitate exercises of the upper extremities.



STATISTICAL SURVEY OF CASES OF ACUTE ANTERIOR POLIOMYELITIS *

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In the year 1948, a total of 362 cases of acute anterior poliomyelitis were seen in the North Carolina Orthopaedic Hospital. Of these, 337 were seen during the months of June through September. Inasmuch as poliomyelitis epidemics vary considerably not only in total number of cases but also in predominating type of involvement, a rather cursory statistical survey for 1948 may be in order for comparison with past and future epidemic years. Certainly the current figures are in sharp contrast to those derived from the previous major epidemic, in 1944, during which over 200 acute cases were seen at the Orthopaedic Hospital, among which there were no deaths, no cases with bulbar involvement and only 1 case in which use of the respirator was necessary.

Of the 362 patients, 205 were admitted to the hospital, and 157 were treated as outpatients. The majority of the patients in the latter group had sufficient paralysis of a spinal type to warrant hospitalization, but they could not be hospitalized, however, because the facilities were completely occupied with patients with and/or respiratory involvement and those showing evidence of high cord involvement.

The age distribution of the patients was as follows: under 1 year, 20; 1 to 4 years, 130; 5 to 8 years, 104; 9 to 12 years, 73; 13 to 16 years, 34; and over 16, 1. Among those under 1 year of age were 2 infants 7 weeks old and 5 others under 6 months of age. The number of patients over 16 does not necessarily represent the actual ratio of cases in that age bracket during this epidemic, since this number in our statistics is affected by the fact that ordinarily 16 is the maximum age at the hospital.

The sex distribution was 199 males to 165 females, a 55:45 ratio, which does not represent a significant differential.

Review of the racial figures shows that 314, or 87 per cent of the patients were white; 46, or just under 13 per cent, were Negro. Two patients were of Indian descent. The apparent disparity between white and Negro elicits some interesting conjectures. The figures tend to indicate a racial resistance. Yet the Negroes who did have poliomyelitis did not show any less severe involvement. The ratio of bulbar cases to spinal cases and the ratio of deaths in the two races were essentially constant. Furthermore, it is impossible to determine whether an actual disparity of any significance exists. The Negro population of the entire State of North Carolina is approximately 31 per cent of the total. However, it must be remembered that the area served by the North Carolina Orthopaedic Hospital, poliomyelitis unit, is a highly industrial one whose principal industries are textile and furniture manufacture, both of which predominantly employ white workers. Consequently, there is some likelihood that the figure of 13 per cent may merely tend to indicate the regional population differential rather than any racial immunity.

A residential analysis indicates that 62 per cent of the patients came from an urban background and 38 per cent from a rural one. This is in sharp

* From the North Carolina Orthopaedic Hospital.

contrast to the figures obtained from the 1940 census for North Carolina, which showed that only 27.3 per cent of the population was urban. Here, again, these figures may not reflect the true ratio for the particular area involved, but the difference is so great that it is unlikely to alter the figures appreciably. If this indicates that poliomyelitis is primarily an urban disease, it is reasonable to assume that population concentration is a potent factor in its spread. But this contention is contradicted, in turn, by a perusal of the familial incidence. Among our 362 cases, there were 300 in which siblings were in close contact with the patients immediately prior to the illness or very likely exposed to the same source. Of these, there were only 10 instances in which a sibling other than the initial patient contracted poliomyelitis and only 1 instance in which more than this second sibling was involved. In addition, there were 2 instances in which playmates were involved and 1 in which 3 members of the same Sunday School class became ill. My favorite example for illustrating the capricious nature of contagion in poliomyelitis concerns 2 brothers, identical twins, aged 2 years. Since the boys were identical twins, it is reasonable to assume the presence of a common immunity and susceptibility. The boys were inseparable, sleeping in the same bed and never being apart during the day. Furthermore, their mother suckled them both on the same bottle without even bothering to wash the nipple, let alone change it. And yet both appeared at the hospital, passing the bottle back and forth, one with a full blown case of poliomyelitis and the other completely free from any sign of it, preceding, during, or after the illness of his brother.

Analysis of the instances in which more than one member of the family contracted the disease reveals the following facts: In 1 instance, 2 brothers had the severe bulbar form in rapid succession, ran a rapid downhill course and died. In another instance, a boy had a moderate severe bulbar form of disease from which he recovered, after which his sister contracted a mild bulbar-spinal form from which she recovered without any weakness. There were 2 instances in which girls survived severe respiratory-spinal involvement with a brother of each showing only a mild spinal form from which recovery was virtually complete. In another instance, the sister of a victim of severe fatal poliomyelitis had only the nonparalytic form. In another family, both a brother and sister had a severe bulbar form, the latter having severe respiratory and spinal paralysis as well; the boy died, and the girl somehow survived. In the other instances, all the patients showed a spinal form of poliomyelitis without any particular similarity of extent or distribution in the individual sets of siblings. Nor was there any consistency as to whether the disease appeared simultaneously or in sequence, indicating either a common source or transmission within the family. Nor was there any consistency between the sequence and the severity.

In many of the sections on poliomyelitis appearing in the textbooks and in the literature, there is the frequent observation that the spinal tap in the acute phase of the disease need not necessarily be positive. Perusal of our data shows the following facts: Of the 205 patients admitted, 199, including 20 without paralysis, had a positive tap; 1 patient with paralysis had a negative tap, and in 5 instances a tap was not done. Of the 157 outpatients, all had a positive tap. The question naturally arises as to what constitutes a positive tap. Our criteria were an increased cell count and a positive Pandy reaction. Without any hard and fast rules, we considered 10 cells as the borderline. If, however, the Pandy reaction was positive, we considered the test positive. It should be noted, however, that there were

exceedingly few instances in which the spinal fluid findings were and remained borderline. It should also be noted that there was no parallel between the intensity of the spinal fluid findings and the severity of the disease. In the majority of instances, the cell count was between 20 and 200 with polymorphonuclear cells predominating early and being replaced by lymphocytes within twenty-four to forty-eight hours. In 2 cases, seen in the pre-paralytic phase, the cell count was about 1,000, with polymorphonuclears predominating and giving rise to a turbid fluid. Definite diagnosis had to await the onset of paralysis, replacement by lymphocytes and a therapeutic test of penicillin.

Among patients sent in because of suspected poliomyelitis we saw children with Guillain-Barré syndrome, tick paralysis, mumps, rheumatoid arthritis, rheumatic fever, pneumonia complicated by heat stroke, emotional syncope, acute deltoid bursitis and tuberculous meningitis and a host of others in whom disease was either not present or detected. We were even solicited by one of the local poultry raisers to cure "the chicken polio" in his merchandise, which ostensibly had limberneck, quite conceivably also a virus disease affecting the nervous system.

In classifying the type of disease, we used the area or areas of the central nervous system whose involvement was indicated by the clinical signs. Thus we arbitrarily have the following types: cranial, for involvement rostral to the medulla; bulbar, for involvement of the medullary centers and motor nuclei situated there; respiratory, for involvement of the anterior horn cells of the phrenic and/or the intercostal nerves, and spinal, for involvement of the anterior horn cells in the cord, not producing respiratory paralysis. We also encountered what we called the encephalitic form, characterized by extreme irritability, convulsions, and coma, not necessarily accompanied with any paralysis. The nonparalytic form is self explanatory.

Of the 205 patients admitted to the hospital, 96 had the spinal type of disease. Two showed exclusively cranial involvement; 21, bulbar; and 1, encephalitic. Twenty patients with the nonparalytic type were admitted, either because of the availability of a bed at that time or for sufficiently extenuating circumstances. There was no instance of respiratory paralysis alone. The rest of the patients all showed various and random combinations, as follows: bulbar-respiratory, 3; bulbar-spinal, 4; respiratory-spinal, 22; bulbar-respiratory-spinal, 20; cranial-bulbar-respiratory-spinal, 2; cranial-bulbar, 25; cranial-spinal, 2; cranial-bulbar-spinal, 2; encephalitic-bulbar, 4; encephalitic-bulbar-respiratory-spinal, 1.

Of the 205 patients admitted, 128 were sent home for outpatient follow-up; 49 were transferred to other institutions, and 28 died. Of the deaths, all but 3 showed severe encephalitic and/or bulbar involvement. One patient with severe respiratory-spinal involvement died of acute myocardial failure during the acute stage. Another with similar involvement died of acute myocardial failure two weeks after the acute phase. His severe myocardial involvement was heralded by his complete inability to remain out of the respirator, despite reasonable return of intercostal power and by his constant need of nasal oxygen even while in the respirator. All heroic efforts to restore the power of the myocardium were fruitless, as is invariably the case in active, progressive myocardial disease. In the third patient also with respiratory-spinal disease in the convalescent phase, who had not been obliged to use the respirator for a month, atelectasis of the right lower lobe developed coincident with an attack of bronchial asthma, necessitating bronchoscopy, from which she recovered uneventfully. One week later, massive

collapse of the right lung developed and she died before any resuscitative procedure could be employed. Thus there were 26 deaths during the acute phase of the disease. Since we were unable to obtain any autopsies, the precise cause of death in each case could not be determined. However, insofar as could be determined clinically, 13 died of acute myocardial failure and 13 died of (or at least with) peripheral vascular failure. This peripheral vascular failure was the same as that seen in the terminal phase of almost any disease, and it would be difficult to attribute it to failure of the cardiovascular regulatory center in the bulb, frequently ascribed in the literature as a cause of death. One patient with severe cranial-bulbar-respiratory-spinal type of disease who recovered, during the height of her illness, showed unmistakable evidence of unilateral involvement of this center for a period of about sixteen hours, but her blood pressure scarcely varied from 100/60 during this time.

As for the myocardial involvement, there has been published¹ in recent years definite pathologic evidence of an acute myocarditis in poliomyelitis that can result in rapid death. A virus pneumonia can also occur, although we were not able to detect its presence in any of our patients.

1. Saphir, Otto: Visceral Lesions in Poliomyelitis, *Am. J. Path.* 21:99 (Jan.) 1945.

COMMITTEE REPORTS AMERICAN CONGRESS OF PHYSICAL MEDICINE

Report of the Finance Committee

The report of our auditor which follows indicates that for the year ending December 31, 1949 the American Congress of Physical Medicine continued to operate on a sound financial basis.

Frank H. Krusen, M.D., Chairman.
Roy W. Fouts, M.D.

Report on Examination for the Year Ended December 31, 1948

May 31, 1949.

American Congress of Physical Medicine,
30 North Michigan Avenue,
Chicago, Illinois.

Dear Sirs:

We have examined the balance sheet of the American Congress of Physical Medicine as of December 31, 1948, and the related summary of net income and surplus for the year then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances, except as stated in the following paragraph.

We did not verify the income from subscriptions to "Archives," a magazine published monthly by the Congress, because it was not considered

practicable. However, we tested the correctness of the subscription income recorded on the books by reference to available supporting data.

Based on our examination, limited to exclude verification of "Archives" subscription income, in our opinion, the accompanying balance sheet and summary of net income and surplus present fairly the financial position of the American Congress of Physical Medicine at December 31, 1948, and the results of its operations for the year then ended in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

We submit the following exhibits:

Exhibit —

- A — Balance Sheet, December 31, 1948.
- B — Summary of Net Income and Surplus for the Year Ended December 31, 1948.

Yours truly,

George Rossetter & Co.

Exhibit A

American Congress of Physical Medicine
(Incorporated in Illinois — Not for Profit)
Balance Sheet, December 31, 1948

(Continued on page 462)

ARCHIVES of PHYSICAL MEDICINE

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

.. EDITORIALS ..

PHYSICAL MEDICINE AND REHABILITATION AT THE ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION

A new milestone in the development of physical medicine and rehabilitation was reached at the annual meeting of the American Medical Association which was held in Atlantic City from June 6 to June 10. At this meeting the wedding of physical medicine and rehabilitation was accomplished and this new special branch of medicine was established on a firm footing for all time. As most of our readers know, the Council on Physical Medicine of the American Medical Association changed its name to the Council on Physical Medicine and Rehabilitation in December, 1948. And just prior to the meeting of the American Medical Association on Friday, June 3, the American Board of Physical Medicine changed its name to the American Board of Physical Medicine and Rehabilitation. The climax came on Tuesday, June 7, when the House of Delegates of the American Medical Association voted to revise its Constitution and to establish a permanent Section on Physical Medicine and Rehabilitation in the American Medical Association.

Contributions of physical medicine and rehabilitation to the success of the Atlantic City session of the American Medical Association were greater this year than ever before. In the Scientific Sessions the number of Sessions on Physical Medicine and Rehabilitation was increased for the first time from one to two sessions and in the Scientific Exhibits the Exhibit Symposium on Physical Medicine and Rehabilitation was the largest ever presented, consisting this year of fifteen booths each containing a live demonstration on some phase of physical medicine and rehabilitation. There were many other exhibits dealing with various phases of physical medicine including one dealing with corrective exercises in treatment of rheumatoid arthritis, one presenting a program for the handicapped, one dealing with injuries to the spinal cord and cauda equina including the physical medical program, one on the training therapy of neurologic disabilities, one on civilian vocational rehabilitation stressing particularly physical medicine, and a particularly interesting exhibit entitled "From amber to radar — the evolution of electrotherapy and light therapy." The Committee on Awards for Scientific Exhibits gave a "special commendation" to the "group of exhibits on physical medicine and rehabilitation which is sponsored by the Baruch Committee on Physical Medicine." The committee noted that it was "Impressed with the excellent demonstrations, especially those on speech rehabilitation." The Committee on Awards also gave "special mention" to the "historical exhibit presented by Richard Kovacs, Samuel Sverdlik and G. F. Frederick on 'From amber to radar.'"

In the Sessions on Physical Medicine and Rehabilitation, the outstanding papers of our foreign guest speakers, Svend Clemmensen of Copenhagen, Denmark, William S. C. Copeman and William S. Tegner of London, England, were of particular interest and the two panels, one on "Certain common

indications for physical medicine and rehabilitation" and the other on "Certain common procedures in physical medicine and rehabilitation" attracted widespread favorable comment.

Undoubtedly physical medicine and rehabilitation attained new heights during the annual meeting of the American Medical Association.

SEVENTH INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES

A polite but most doubtful smile would have been the only answer, if a few years ago someone would have asserted that the large ballroom of New York's Waldorf-Astoria Hotel could be filled up to capacity on a holiday week end with medical men from all parts of the globe interested in "rheumatism." Yet precisely this was the case on Decoration Day, 1949 when the Seventh International Congress on Rheumatism convened. The keen interest of physicians at the meeting and of the public press continued unabated until the closing sessions on June 3rd. The meeting was held under the auspices of the International League Against Rheumatism; the host was the American Rheumatism Association which with support by the new Arthritis and Rheumatism Foundation, drew up the most comprehensive plan of the meeting and arranged for the transportation and housing for physicians from many sections of the world. In the local arrangements, trips to clinics, entertainment and women's activities, the New York Rheumatism Society "did itself proud." The nations represented at the meeting were: Argentina, Australia, Belgium, Brazil, Canada, Chile, Denmark, Egypt, Finland, France, Great Britain, India, Italy, Mexico, Netherlands, New Zealand, Norway, Palestine, Poland, Portugal, Sweden, Switzerland, Turkey and Uruguay. Amongst the large number of participants from Great Britain, were Lord Horder, Drs. Francis Bach, W. S. Copeman, Ernest Fletcher, Francis Herniman Johnson and William Tegner. Among those from the Scandinavian countries were: Drs. Svend Clemmesen, Ejnar Jarlov, Kai Jaspersen, of Denmark; Lilli Bernstein, Halvard Hegna, of Norway; and Gunnar Edstroem, of Sweden.

The plan of meeting consisted of seven plenary sessions which began with the presentation of the histo-physiology and chemical composition of connective tissue and relation of its substances to rheumatic diseases, continued with the synovial membrane in osteoarthritis, the range of pathologic reaction which can be displayed by the human synovial tissues and the histologic and chemical changes in the skeletal muscle in rheumatic and non-rheumatic diseases. After discussing the therapeutic value of copper salts came the highly dramatic and highly publicized presentation of the observations on the effects of the hormone of the adrenal cortex, Corticon or Compound E on rheumatoid arthritis by Hench and his coworkers at the Mayo Clinic. Among the subjects discussed at the later plenary sessions were the effects of endocrines on articular tissues, the possible relationship of pituitary adrenal function in arthritis, the physiology of muscle in relation to arthritis, the pathologic anatomy of collagen diseases, the protean nature of connective tissue diseases, sensitization with tissue agents, analysis of plasma proteins, immunologic reactions in rheumatoid arthritis, streptococcal toxins and enzymes, etc. In connection with these plenary sessions panel discussions were held on gout, rheumatic fever, rheumatoid arthritis and gold salt therapy, etc. The type and timing of all these presentations was of the highest order and simultaneous translations into Spanish or French were

provided with the remarkable headphone system as used at the United Nations. In addition to the thorough presentation of the histopathology and therapeutic aspects of rheumatism, every afternoon clinical presentations were offered in leading metropolitan hospitals on other important aspects, such as: specific infectious arthritides, osteoarthritis, fibrositis and disorders of soft tissues, the painful shoulder, unusual diseases of bones and joints, psychogenic factors in arthritis and other musculoskeletal disorders, gout and gouty arthritis, etc.

Two entire clinical sessions were devoted to physical medicine and rehabilitation, one on Rehabilitation in Arthritis and Related Disorders held under the chairmanship of Howard A. Rusk at the Rehabilitation Center of New York University; the other on Physical Medicine in Arthritis and Related Disorders under the chairmanship of Richard Kovács at the New York Polyclinic Medical School and Hospital. There were ample discussions and all of these together with the original papers are to appear in the "Proceedings of the Congress" which should be a volume of unique importance.

The most striking feature of the Congress in its relation to physical medicine was the fact that most of the rheumatologists from abroad professed to be equally interested in physical medicine and declared that without the extensive use of physical therapy they could not practice. At the Congress itself, it was decided to hold in 1951 at Zurich, Switzerland, an International Congress on Rheumatism and Physical Medicine. Interestingly enough, following the Congress, a number of American rheumatologists inquired about the possibility of applying for certification under the American Board of Physical Medicine and Rehabilitation. All of this corroborates the conception repeatedly emphasized by many physicians, that in the management of rheumatic diseases physical medicine should form an important, integral part and that wide cooperation between rheumatologists and physiatrists should serve the best interest of their patients.

RALPH PEMBERTON

1877-1949

The Congress has learned with deep regret of the death on June 20 of Dr. Ralph Pemberton in Philadelphia. Dr. Pemberton will be remembered for his strenuous activity in raising the standards of physical medicine and for his ardent desire to promote the scientific status of physical medicine and to encourage its clinical practice. Dr. Pemberton, who was a charter member of the Council on Physical Medicine and Rehabilitation, suggested the appointment of Consultants on Education to the Council who were in turn instrumental in the appointment of speakers to stimulate the use of physical therapeutic measures to a greater extent among the members of the profession at large. He rendered valued service in his published articles on the use of massage and heat in the treatment of disease, especially in the management of rheumatism and arthritis. In recognition of these services, in 1946, Dr. Pemberton was awarded the Gold Key of the Congress.



(Continued from page 458)

Assets	
Current Assets:	
Cash in bank and on hand	\$ 6,560.85
Accounts receivable:	
Advertisers and exhibitors	\$ 521.50
Members' dues	188.00
American Registry of Physical Therapy Technicians	2,383.32
American Society of Physical Medicine	20.00
Total	\$ 3,112.82
Less reserve for doubtful accounts	200.00
	2,912.82
Investments in United States Savings, bonds, Series G—at cost	20,000.00
Accrued interest	166.66
Deposit at United States Post Office	50.00
Total	\$29,690.33
Liabilities	
Current Liabilities:	
Account payable — New York Society of Physical Medicine	\$ 70.00
Employees' income tax withheld	406.50
Total current liabilities	\$ 476.50
Deferred Income:	
Subscriptions to "Archives"	
— unexpired portion	\$ 6,981.23
Dues collected in advance	
— year 1949	1,187.00
Total deferred income	8,168.23
Surplus, per Exhibit B	21,045.60
Total	\$29,690.33
Exhibit B	
American Congress of Physical Medicine	
Summary of Net Income and Surplus	
for the Year Ended December 31, 1948	
Income:	
Members' dues	\$ 4,889.50
"Archives":	
Advertising	\$ 5,970.05
Subscriptions	10,258.61
Sale of cuts, etc.	815.62
	17,044.28
Interest on United States Government securities	500.00
Convention income:	
Exhibits	\$ 5,175.00
Special instruction course	2,287.00
Banquet	1,421.00

Total	\$ 8,883.00
Direct convention expenses	7,018.84
Convention income — net	1,864.16
Miscellaneous	75.89
Total income	\$24,373.83
Expenses:	
Office expenses and salaries	\$16,207.02
Printing expense — "Archives"	10,607.56
Cuts, half-tones, electros, etc.	1,062.68
Telephone and telegraph	272.34
Sectional meetings	39.00
Educational conference	432.80
Bank exchange	21.25
Professional fees	530.60
Loss on doubtful accounts	235.00
Traveling	117.75
Cash discount on advertising	151.53
Contribution to Everhardt Memorial Fund	50.00
Miscellaneous	76.70
Total expenses	\$29,804.23
Less share of office expense billed to:	
American Society of Physical Medicine	\$ 120.00
American Registry of Physical Therapy Technicians	7,200.00
	7,320.00
Expenses — net	22,484.23
Net income for the year	\$ 1,889.60
Surplus at beginning of the year	19,156.00
Surplus at end of the year	\$21,045.60

Report on Examination for the Year Ended December 31, 1948

June 1, 1949.

American Registry of Physical Therapy Technicians,
30 North Michigan Avenue,
Chicago, Illinois.

Dear Sirs:

We have examined the balance sheet of the American Registry of Physical Therapy Techni-

cians as of December 31, 1948, and the related statement of net income and surplus for the year then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statement of net income and surplus present fairly the financial position of the American Registry of Physical Therapy Technicians at December 31, 1948, and the results of its operations for the year then ended in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

We submit the following exhibits:

Exhibit —

- A — Balance Sheet, December 31, 1948.
B — Statement of Net Income and Surplus for the Year Ended December 31, 1948.

Yours truly,

George Rossetter & Co.

Exhibit A

American Registry of Physical Therapy Technicians

(Incorporated in Illinois — Not for Profit)

Balance Sheet, December 31, 1948

Assets

Current Assets:

Cash on deposit.....	\$ 7,206.59	
Accounts receivable — dues	\$ 292.00	
Less reserve for possible losses	100.00	192.00

Investment in United States Savings bonds, Series G — at cost.....	14,500.00	
Accrued interest	116.65	

Total \$22,015.24

Liabilities

Current Liabilities:

Account payable — American Congress of Physical Medicine	\$ 2,383.32	
Accrued federal excise tax	22.50	
Sundry	3.00	

Total current liabilities \$ 2,408.82

Deferred Income:

Dues collected in advance — year 1949.....	\$ 6,026.50
Deposits with applications (subject to refund if applications are rejected)....	10.00

Total deferred income 6,036.50
Surplus, per Exhibit B..... 13,569.92

Total \$22,015.24

Exhibit B

American Registry of Physical Therapy Technicians

Statement of Net Income and Surplus for the Year Ended December 31, 1948

Income:

Dues	\$ 7,108.00
Registration fees	4,472.00
Sales:	
Pins	1,141.00
Emblems	295.15
Directory	178.65
Interest on United States bonds	362.50
Miscellaneous	21.35
Total income	\$13,578.65

Expenses:

Share of office expense billed by American Congress of Physical Medicine — office expenses, and salaries	\$ 7,200.00
Printing and multigraphing	934.47
Directory	667.23
Examinations — supervision and grading	248.00
Special educational conference	958.91
Board meeting	336.91
Purchase of pins	767.50
Office equipment and supplies	281.28
Telephone and telegraph	42.97
Postage	11.69
Exchange	49.33
Fidelity bond premium	25.00
Professional fees	549.05
Loss on doubtful accounts	270.00
Travel	15.70
Contribution to Ewerhardt Memorial Fund	50.00
Miscellaneous	6.50

Total expenses 12,414.54

Net Income for the Year..... \$ 1,164.11

Surplus at Beginning of the Year 12,405.81

Surplus at End of the Year..... \$13,569.92

Report American Registry Physical Therapy Technicians

Period Jan. 1 to Dec. 31, 1948

Number registrations completed.....	368
Number examinations conducted.....	460
Number retake examinations conducted.....	27
	1947 1948
Number of requests for qualified personnel	385 637
Number of requests for positions.....	394 427
Number of placements completed.....	81 174

Certificates Issued According to School of Graduation

Name of School	Number of Graduates Registered
Albany Hospital, Albany, N. Y.	5
Ashtford General Hospital, White Sulphur Springs, W. Va.	1
Barnes Hospital, St. Louis.....	12
Boston Univ. College of Physical Education for Women, Sargent College, Cambridge, Mass.	20
Bouve-Boston School of Physical Education, Boston	11
Brooks General Hospital, San Antonio, Texas	2
University of California Hospital, San Francisco	12
Children's Hospital, Los Angeles.....	27
College of Medical Evangelists, Los Angeles.....	16
Columbia University College of Physicians and Surgeons, New York City.....	27
Duke Hospital, Durham, N. C.	9
Simmons College, Boston.....	1
State University of Iowa Medical School, Iowa City	14
Percy Jones General Hospital, Battle Creek.....	2
University of Kansas School of Medicine, Kansas City	12
Lawson General Hospital, Atlanta, Ga.	1
Mayo Clinic, Rochester, Minn.	46
New York University School of Education, New York City.....	4
Northwestern University Medical School, Chicago	15
O'Reilly General Hospital, Springfield, Mo.	3
Graduate Hospital of the University of Pennsylvania, Phila.	2
Walter Reed General Hospital, Washington, D. C.	5
Baruch Center of Physical Medicine of the Medical College of Virginia in affiliation with Richmond Professional Institute, Richmond.....	41
St. Louis University School of Nursing, St. Louis	11
University of Southern California, Los Angeles	11
Stanford University, Stanford University, Cal.	33
University of Texas School of Medicine, Galveston	6
D. T. Watson School of Physiatrics, Leetsdale, Pa.	5
University of Wisconsin Medical School, Madison	14
	368

Report of the Membership Committee

The Committee on Membership again reports with satisfaction a steady increase in the number of new members from all parts of the United States and abroad. At the meeting of the Congress, Sept., 1948, eighty-four applicants were elected to membership, with the following geographic distribution: New York, 13; Minnesota, 9; Illinois and Pennsylvania, 8 each; Texas, 5; District of Columbia and Virginia, 3 each; California, Connecticut, Florida, Georgia, Massachusetts, Missouri, New Jersey, Ohio and Oklahoma, 2 each; Alabama, Arkansas, Colorado, Indiana, Michigan, North Carolina, South Dakota and West Virginia, 1 each; abroad, Mexico, 2; Brazil, Canada, England, Hawaii, New Zealand, Turkey and Uruguay, 1 each.

The membership census on June 1, 1949, showed a total membership was 645, geographically distributed as follows:

State	Number of Members	State	Number of Members
Alabama	2	Nevada	1
Arizona	3	New Jersey	17
Arkansas	3	New York	130
California	32	North Carolina	5
Colorado	6	Ohio	29
Connecticut	10	Oklahoma	3
District of Columbia	20	Oregon	3
Florida	8	Pennsylvania	66
Georgia	8	Rhode Island	3
Illinois	34	South Dakota	1
Indiana	12	Tennessee	7
Iowa	9	Texas	17
Kansas	5	Utah	2
Kentucky	4	Virginia	12
Louisiana	4	Washington	2
Maine	1	West Virginia	2
Maryland	7	Wisconsin	16
Massachusetts	17		
Michigan	11	Abroad	
Minnesota	21	Canada	17
Mississippi	2	Other	29
Missouri	8	Address Unknown	3
Nebraska	3		

Membership outside of the United States, totaling 46 was distributed as follows: Canada, 17; Brazil, 5; Mexico and Turkey, 4 each; Australia, Hawaii, Portugal and Uruguay, 2 each; Belgium, Cuba, Denmark, England, Greece, New Zealand, Puerto Rico and Venezuela, 1 each.

At the time of rendering this report the number of new applications pending was 32.

Richard Kovács, M.D., Chairman.

Robert F. Dow, M.D.	Theodore Stonehill, M.D.
William D. Paul, M.D.	Arthur E. White, M.D.

MEDICAL NEWS

Awards at Atlantic City

At the Convention of the American Medical Association, June 6 to 10, 1949, Atlantic City, N. J., the following exhibits participated in by members of the Congress, received awards:

Special commendation was given to the group of exhibits on physical medicine and rehabilitation which was sponsored by the Baruch Committee on Physical Medicine under the chairmanship of Dr. Frank H. Krusen. The Committee on Awards was impressed with the excellent demonstrations, especially those on speech rehabilitation.

Honorable mention was awarded the Scientific Exhibit on Spinal Cord Injuries which was sponsored by Dr. Lewis J. Pollock and his associates, Department of Nervous and Mental Diseases, Northwestern University Medical School, together with Dr. Louis B. Newman, Chief of Physical Medicine Rehabilitation and his associates, Veterans Administration Hospital, Hines, Illinois.

The exhibit showed pictorially and graphically a three-year follow-up of 300 patients with spinal cord injuries who had received Physical Medicine and Rehabilitation, as well as the Neurological aspects and Plastic Surgery for decubitus ulcers.

Special mention was made of the historical exhibits presented by Richard Kovacs, Samuel Swerdlik and G. F. Frederick, New York Polyclinic Medical School, New York, on From Amber to Radar — The Evolution of Electrotherapy and Light Therapy.

Sir Morton Smart Honored

The King of England has made Sir Morton Smart a Knight of the Grand Cross of the Royal Victorian Order which is the highest personal award he can give for services to himself and family. The bearer of this award uses the designation of G.C.V.O. after his name.

Sir Morton Smart's numerous friends and admirers in the United States will rejoice over this news. It was Sir Morton Smart who, in his capacity as Orthopedic Surgeon to the King first recognized the serious nature of the King's recent illness and who assembled the group of experts whose joint counsel has brought about the prompt recovery of His Majesty.

New Appointment for Dr. Newman

Dr. Louis B. Newman has been recently appointed as a member of the Medical Advisory and Consultant Board of the Armour Research Foundation of Illinois Institute of Technology, Chicago, Illinois. This Board is to select suitable problems for research in the medical field and to

advise an Engineering Staff on the medical aspects of these problems.

Dr. Newman, who is Chief of the Physical Medicine and Rehabilitation Service at the Veterans Administration Hospital, Hines, Illinois, received his degree in Mechanical Engineering from the Illinois Institute of Technology, just prior to studying medicine.

Dr. Northway Speaks at Medical Meeting

Dr. William H. Northway, San Francisco, was guest speaker at the annual meeting of the South Dakota State Medical Association, held in the Civic Auditorium, Yankton. The topic of his address was "Convalescent Care of Poliomyelitis Patients."

Dr. R. H. Young Appointed Northwestern University Medical Dean

Dr. Richard H. Young, alumnus and former faculty member of Northwestern University and now dean of the college of medicine of the University of Utah, has been named dean of Northwestern's medical school, succeeding Dr. J. Roecoe Miller, who became president of the university in July.

Dr. Zankel Speaks

On May 17, 1949, at Toledo, Ohio, Dr. Harry T. Zankel, Chief, Physical Medicine Rehabilitation, Crile VA Hospital, addressed the National Rehabilitation Association, Regional Conference, on "The Relation of Physical Medicine to Vocational Rehabilitation."

Fellowships Awarded by the National Foundation for Infantile Paralysis

The National Foundation for Infantile Paralysis announced that 21 physicians have been awarded postgraduate fellowships in the fields of physical medicine, scientific research and public health. Seven other physicians have been approved for fellowships in the same fields for training to begin later this year.

Fellowship awards were made to 12 physicians for training in physical medicine and three other physicians were approved for such fellowships. Those who received awards are:

Drs. Louis P. Britt, Jr., of Richfield, N. C.; Thomas F. Hines, of Berwick, Pa., and Duane Arthur Schram, of Seattle, Wash., for training at Georgia Warm Springs Foundation and Emory University Hospital, Atlanta, Ga.; Dr. Gerald G. Hirschberg, of New York City, for training at the Veterans Administration Hospital, New York

City; Dr. William Jacob Shriber, of Jamaica Plain, Mass., for training at the Boston University College of Medicine, Massachusetts General Hospital, and Massachusetts Institute of Technology.

Also, Dr. Leonard Jerome Yamshon, of Cleveland, Ohio, for training at the New York University-Bellevue Medical Center; Dr. Charles A. Furey, Jr., of Philadelphia, Pa., for training at the University of Pennsylvania Hospital and Philadelphia General Hospital; Dr. Ella Mary George, of Dallas, Texas, for training at the New York University-Bellevue Medical Center; Dr. Keith C. Keeler, of Lewiston, Idaho, for training at the New York University-Bellevue Medical Center, Goldwater, Willard Parker, and Lenox Hill Hospitals, and Massachusetts Institute of Technology; Dr. Ward Michael Schultz, of Hollis, N. Y., for training at the New York University Medical Center, Willard Parker and Lenox Hill Hospitals; Dr. Joseph Leonard Koczur, of Chicago, Ill., for training at the Children's Rehabilitation Institute, Cockeysville, Md., and the Massachusetts General Hospital; and Dr. Emery Kaufman Stoner, of Philadelphia, Pa., for training at the University of Pennsylvania Hospital.

Fellowships in physical medicine are made to physicians who wish to prepare for eligibility for certification by the American Board of Physical Medicine and Rehabilitation. Fellows must agree to practice as specialists in physical medicine for a minimum of two years following their fellowship training, to complete the Board requirements.

National Foundation fellowships in scientific research were awarded three physicians while two other fellowships were approved for award later in the year.

Also the National Foundation awarded six fellowships in public health while two others were approved for award later in the year.

Dr. Rappleye Appointed a Vice-President at Columbia

Dr. Willard C. Rappleye, dean of Columbia University, College of Physicians and Surgeons, was recently appointed Vice-President in charge of medical affairs at Columbia University. General Eisenhower's announcement specified that this position shall be held by the dean of the faculty of medicine. The creation of the new office, among others, resulted from a survey begun nearly two years ago.

Physical Therapists Promoted

The Surgeon General of the Army announces the recent promotion of the following Physical Therapists in the Women's Medical Specialist Corps to the temporary grade of Captain:

Marcel Binning, Army and Navy General Hospital, Hot Springs, Ark.; Dorothea Fleischer, Station Hospital, Fort Belvoir, Va.; Cesira A. Frazy, Fitzsimmons General Hospital, Denver, Colo.; Dorothy B. Locke, Station Hospital, Fort Monmouth, N. J.; Julia M. Mikals, Station Hospital,

Chanute Field, Ill.; Inez Moffitt, Percy Jones General Hospital, Battle Creek, Mich.; Millicent J. Murrell, Brooke General Hospital, Fort Sam Houston, Tex.; Adelina E. Pirone, Murphy General Hospital, Waltham, Mass.; Flora M. Rand, William Beaumont General Hospital, El Paso, Tex.; Corrine C. Rizzo, Brooke General Hospital, Fort Sam Houston, Tex., and Alice Valentine, Station Hospital, Fort Bragg, N. C.

Successor to Dr. Waters Named

Dr. Alexander M. MacKay has been named sub-chairman of the department of anesthesiology at the University of Wisconsin, to succeed Dr. Ralph Waters, world famous anesthetist and former department head. Dr. MacKay holds the Diploma in Anesthetics of the Royal College of Physicians and Surgeons of England and has been certified as Specialist in Anesthetics by the Royal College of Surgeons, Canada.

Physical Medicine at the National Medical Association

The National Medical Association is holding its annual meeting in Detroit, August 8 to 12, 1949, at the Horace Rackham Memorial Building. On August 12, the program is as follows:

Physical Medicine in General Practice. M. K. Newman, M.D., Director of Physical Medicine, Grace Hospital and Wayne University, Detroit.

Physical Medicine in the Management of Hemiplegia. W. B. Snow, M.D., Director of Physical Medicine, Columbia-Presbyterian Medical Center, New York, N. Y.

Physical Medicine in the Management of Arthritis. W. D. Paul, M.D., Director of Physical Medicine, State University of Iowa, Iowa City, Iowa.

Symposium on the Use of Physical Medicine in the Practice of Medicine. The Essayists: Drs. Newman, Snow, Paul.

Veterans Administration Reports Good Results with Hemiplegics

Physical medicine technics in treatment of hemiplegic patients are highly efficacious, according to the findings of a study conducted by the Veterans Administration hospital at Dearborn, Mich., and made public at Veterans Administration headquarters in Washington. Of 48 patients reported on and who underwent treatment since Jan. 1, 1948, 30 have been discharged to their homes, 2 sent to domiciliary homes and 1 transferred to another veterans hospital for further rehabilitation. Twelve of the 33 formerly were confined to bed and 5 were wheelchair patients. All are now able to walk. Treatment averaged ten weeks in length, with a span from one week to ten months. Duration of the hemiplegic condition before physical medicine procedures were instituted averaged ten months, with a range of one month to five years.

Dr. Volpe to Dwight VA

Dr. Peter A. Volpe, Acting Area Chief of Medicine at Columbus, Ohio, and recently Medical Director of the former Veterans Administration Branch No. 6, became Manager of the VA Hospital at Dwight, Illinois, on July 1, 1949, succeeding Dr. Septimus T. Taylor.

A World War II veteran, Dr. Volpe, has been affiliated with VA since August, 1946, when he became Chief, Physical Medicine Rehabilitation Section, Branch No. 6, Columbus, Ohio. Subsequently he was made Branch Medical Director, a post he held until the elimination of the branch offices.

Apparatus Accepted

Paravox Hearing Aid Model Y. — There are three variations of the Paravox Hearing Aid Model Y — one has a magnetic receiver, one has a crystal receiver and one is designed for low battery drain. The instrument is an all-in-one model and is equipped with a Duo-Range Control. The Council on Physical Medicine and Rehabilitation voted to include this model in its list of accepted devices.

Beck-Lee Model E Electrocardiograph. — This electrocardiograph is of the portable string galvanometer type.

The instrument is built for operation on alternating current at 110 to 120 volts and draws 70 watts. Converters are available to permit operation on direct current. The Council on Physical Medicine and Rehabilitation voted to include this model in its list of accepted devices.

Edin Ink-Writing Electronic Cardiograph Model 219T Acceptable. — The Edin Electrocardiograph Model 219T is portable and housed in a carrying case. Operates on 110 or 220 volt circuits, direct or alternating current at 60, 50, 40 or 25 cycles. The device comes equipped with an individual timing check device operated by synchronous motor. The Council on Physical Medicine and Rehabilitation voted to include this model in its list of accepted devices.

Otarion Hearing Aid Model E-4. — The Otation Model E-4 contains microphone, amplifier and batteries in a single case. The Council on Physical Medicine and Rehabilitation voted to include this model in its list of accepted devices.

Collins Vitalometer. — The Collins Vitalometer is a spirometer designed for determination of vital capacity and related respiratory measurements. The instrument was given a practical trial in connection with a study of spirometry in tuberculosis. The Council on Physical Medicine and Rehabilitation voted to include the instrument in its list of accepted devices.

BOOK REVIEWS

THE PARATHYROID GLANDS AND METABOLIC BONE DISEASE. SELECTED STUDIES. By Fuller Albright, A.B., M.D., Associate Professor of Medicine, Harvard Medical School, Boston, Mass.; Physician, Massachusetts General Hospital, Boston, Mass.; and Consulting Physician, Massachusetts Eye and Ear Infirmary, Boston, Mass.; and Edward C. Reifenstein, Jr., A.B., M.D., F.A.C.P., Consultant-in-Charge, Department of Clinical Investigation, Sloan-Kettering Institute of Cancer Research, Memorial Hospital Cancer Center, New York; Clinical Research Consultant, Ayerst, McKenna and Harrison, Ltd., New York; formerly Research Fellow in Medicine, Harvard Medical School, Boston, Mass.; and formerly Graduate Assistant in Medicine, Massachusetts General Hospital, Boston, Mass. Cloth. Pp. 393, illustrated. Price, \$8.00. The Williams & Wilkins Company, Mount Royal and Guilford Avenues, Baltimore 2, Md., 1948.

The parathyroid glands have never received the attention in book form they deserve. However, this volume fills this void to overflowing. It will be a fool hardy author who will attempt to com-

pete with this work for many, many years to come. Medical classics have appeared on various subjects through the years, this book will represent metabolic bone diseases. It is difficult to maintain proper restraint in complimenting this book. It is unquestionably the most complete and up to date work on these disorders and written in a style that leaves nothing to be desired.

Nine chapters make up the book: Normal and pathologic physiology of the parathyroid glands; clinical hypoparathyroidism; clinical hyperparathyroidism; mode of action of Vitamin D; metabolic bone disease, general consideration; metabolic bone disease-osteoporosis; metabolic bone disease-osteomalacia; polyostotic fibrous dysplasia or osteitis fibrosa disseminata and Paget's disease.

The opening paragraph of the preface is an example of the charming style of writing, "on starting to write the preface, it occurred to the authors that it might be well to incorporate their own critical review." The thought existed, it must be admitted, that, by pointing out the shortcomings in particular, the wind might be taken out of the sails of those of the reviewers who will

be impressed largely by the faults of this work. In other words, we are incorporating a little prophylactic criticism." This same disarming manner can be further illustrated by the explanation for results of changes in the serum calcium and phosphorus levels, when he starts off with "Now for some simple arithmetic!" Another bit in this same chapter is the humorous twist at the conflict that has arisen between the two groups on the metabolism of bone headed by Albright and by Collip; and in the illustration of the X-Ray appearance of the five different types of kidney stones, he has a black space for the uric acid stone with the caption "note that you see nothing." And the good sense demonstrated in describing the Sulkowitch test "one can modify the technic by adding more and more refinements until one reaches a complete metabolic study et cetera, et cetera! By this time the simplicity of the test has been lost so one might as well proceed with a quantitative chemical determination."

Most everyone finds the subject of metabolic bone diseases rather complicated, and rightly so, but the manner of presentation of these authors demonstrates a way to consider it orderly and rational, making a relatively difficult subject understandable and even enjoyable. This does not mean that the book can be read quickly or indifferently, far from it; there is too much real substance in each and every paragraph. One reading of the book clarifies the problems considerably, a second reading will be even more profitable.

The frequent use of case histories with explanations of the pertinent findings aids in understanding the physiologic derangements. The characteristic touch of Dr. Albright is evident here too, for example in the history for a case of localized osteitis fibrosa in a 14 year old school boy, "he jumped on home plate after making a home run," or that of Mrs. P. G., who is called a "spinster" or of a patient with Boeck's sarcoid "she completely regained her health and was married."

This book should interest practically everyone in medicine, the physiologist and pathologist must have prayed for this book, the internist, the orthopedist and the pediatrician will use it often, the rheumatologist will be helped in a better understanding of some of the problems concerning the physiology of cartilage and bone, and the physiatrist will find information which can be put to advantage in the use of physical measures, as an example in the statement about osteoporosis the following cannot be overemphasized "since the normal stimulus to the osteoblasts is stresses and strains, any enforced immobilization of all or part of the skeleton will lead to decreased osteoblastic activity, and hence, bone resorption continuing, to osteoporosis of the parts of the skeleton immobilized" or in an understanding of fracture repair "if bone is broken and set at a new angle the new bone is laid down in accordance with the new stresses involved. If an extremity is put into a cast, thus stopping all stress-

es, the bone loses calcium probably due to lack of bone formation rather than to increased bone resorption."

The illustrations are numerous, well selected and clearly reproduced. The frequent use of the typical Albright diagram showing the metabolic studies of various cases are beautifully done. The diagrams are disturbing since they put to shame the efforts of others. It does not seem possible that one man and his associates can do so much work and correlate it so well. The diagrammatic representation of calcium metabolism, both normal and in these various parathyroid diseases which have appeared in previous publications are included and if this group did nothing else, they would entitle them to immortality.

The publisher should receive his share of credit for producing a book of such unusual excellence typographically.

DIRECTORY OF THE AMERICAN COLLEGE OF HOSPITAL ADMINISTRATORS, 1948. Paper. Price, \$10.00. Pp. 331. American College of Hospital Administrators, 22 E. Division St., Chicago 10, 1948.

This directory, the fourth in a series of biographical catalogues, has become a handbook of information for hospital administrators, a valuable reference book for trustees and others making committee, program or position assignments. It answers a great demand in the hospital field for administrators as well as others who need a personal and a professional directory.

THE POETRY OF HISTORY. THE CONTRIBUTION OF LITERATURE AND LITERARY SCHOLARSHIP TO THE WRITING OF HISTORY SINCE VOLTAIRE. By *Emery Neff*. Cloth. Pp. 258. Price, \$3.50. Columbia University Press, 2690 Broadway, New York 27, 1947.

In this account of historical writing from Voltaire to Toynbee, the author shows how its spirit, form and content have been affected by literature and literary scholarship, in conjunction with political events and with change in science and industry. For those who are interested in the history of ideas, in man's attempts at self-analysis and self-comprehension, this is a penetrating and stimulating study, showing as it does the flow of history, mingling ideas, events and artistic creations.

EXPERIMENTAL AIR-BORNE INFECTION: EQUIPMENT AND METHODS FOR THE QUANTITATIVE STUDY OF HIGHLY INFECTIVE AGENTS; BASIC DATA ON THEIR USE OBTAINED WITH PHENOL RED, *SERRATIA MARCESCENS* AND *BACILLUS GLOBIGI*; AND PRELIMINARY EXPERIMENTS ON THE STABILITY AND INFECTIVITY FOR LABORATORY ANIMALS OF AIR-BORNE CLOUDS OF *BRUCELLA SUI*, *MALLEOMYCES MALLEI*, *MALLEOMYCES PSEUDOMALLEI*, *PASTURELLA TULARENSIS*, AND OF VIRUSES OF THE PSITTACOSIS GROUP. By *Theodor Rosebury*. With the co-authorship and assistance of the Staff of the Laboratories of Camp Detrick, Maryland. Microbiological Monographs (1). Official Publication of the Society of Ameri-

can Bacteriologists. Cloth. Price, \$4.00. Pp. 222, with 45 illustrations. Williams & Wilkins Co., Mount Royal and Guilford Aves., Baltimore 2, 1947.

A cloud-chamber project to study air-borne infection was instituted at Camp Detrick in December, 1943. This book is said to be the first volume in a series of publications by the Society of American Bacteriologists under the title of "Microbiological Monographs" dealing with the project. Buildings at the camp were selected and equipment installed with the object in view of developing new technics to study the fundamental mechanisms involved in air-borne infections.

This book summarizes the work done between December, 1943 and October, 1945. The volume describes the apparatus, explains the method of making a cloud containing bacteria, how the animals were controlled and managed, and tables of data. The major portion of the book records the studies and results of experimental air-borne disease. Space does not permit elaboration on these data presented. It would appear, therefore, that in the coming publications further light will be shed on the use of ultraviolet radiation and glycol mixtures in the control of air-borne bacteria. This book is a valuable contribution to the fundamental problems of air-borne infection.

CHANGING DISCIPLINES: LECTURES ON THE HISTORY, METHOD AND MOTIVES OF SOCIAL PATHOLOGY. By *John A. Ryle, M.D.*, Professor of Social Medicine in the University of Oxford, Oxford. Oxford Medical Publications. Fabrikoid. Price, \$3.75. Pp. 123, with 13 illustrations. Oxford University Press, 114 Fifth Ave., New York 11; Amen House, Warwick Sq., London, E.C. 4, 1948.

The title of this book is a good one but unfortunately does not in itself attract attention of the persons in the medical field whom it should interest. The author's purpose for the book is well explained in his own words "assisting a gradual re-orientation of ideas and some changes of emphasis in the general disciplines of schools." The change he has in mind is the broader aspect of medical interest — a consideration for "health" and all that implies rather than on "disease." He develops his idea of "social medicine" which he maintains "depends largely upon studies of human groups or population as distinct from human units." This might suggest the functions of the Public Health Services but his objectives have far greater potentialities. His interest is in the "living human community." As he states Public Health emphasizes the environment whereas social medicine, the man and his relation to the environment.

It is a small book containing the two lectures given by Professor Ryle on his visit to the United States plus material used in other lectures setting forth his "new idealism and new realism" for medicine. His motivating theme is "social medicine" not for what the term implies in this country

but as he expresses it a "predisposing or ultimate (as distinct from the intimate or specific) causes of the prevailing diseases." "The individual necropsy may reveal the extent and character and processes of a disease and the final cause of death, but it is silent about the circumstances which led to the development of the original morbid change." He speaks of cholera, plague, leprosy and hookworm as "social diseases" because they are associated with or influenced by "dirt, poverty, squalor, malnutrition and ignorance." In it the Oxford experiment is described. This is a study in the area of Oxford which has been in progress for four years and pertains to various social and public health problems. A most interesting study.

A chapter on "Social Post-Mortem Examination and its Bearing on Etiological Research" considers specifically pulmonary tuberculosis, peptic ulcer, coronary disease and cancer of the skin in which a correlation is attempted between their incidence and the sociological or other predisposing factors.

Several books have appeared during the past few years, particularly well written by the British which show the trend toward this concept of a patient as a "total person" and the influence of environmental factors, not only on his physical functions but his mental and emotional equipment as well. This book is a worthy contribution to this idea.

MEDICINE AND SCIENCE IN POSTAGE STAMPS. By *W. J. Bishop, F.L.A.*, Librarian, Wellcome Historical Museum, and *N. M. Matheson, F.R.C.S.*, Surgeon, Ashford County Hospital, Middlesex, Boards. Price, 7s. 6d. Pp. 82, with illustrations. Harvey & Blythe, Ltd., 6, Hanover Sq., London, W.1; distributed by H. K. Lewis & Co., Ltd., 136 Gower St., London, W.C.1, 1948.

The literature of medical philately is extensive but scattered, and many articles are in journals not easily accessible to the general reader. Apparently this is the first book on the subject to be published. In writing this little book the authors have been concerned with the story behind the stamps rather than with the purely philatelic details that are already recorded in the standard catalogs. The emphasis throughout is on the medical and allied sciences.

GIVE THEM A CHANCE TO TALK: HANDBOOK ON SPEECH CORRECTION FOR CEREBRAL PALSY. By *Bernice R. Rutherford.* Paper. Price, \$2.75. Pp. 116, with illustrations. Burgess Publishing Co., 426 S. Sixth St., Minneapolis 15, 1948.

This handbook is concerned with a detailed and entirely practical presentation of the problem of speech training for individuals with cerebral palsy. The different types of speech difficulties likely to be encountered are described; also the common varieties of neuromuscular dysfunction seen in the cerebral palsied. No attempt is made to consider in any detail the pathology or abnormal neu-

rophysiological mechanisms. The bulk of the monograph deals with the principles of teaching speech and the details of techniques to be employed. The text is amplified by a few photographs and illustrative diagrams which might be increased in future editions. Selected references are included and an appendix containing record forms and description of equipment to be used. This booklet should be very valuable to all concerned with speech training in cerebral palsy as a practical working guide and reference.

PLASTER OF PARIS TECHNIC. By *Edwin O. Geckeler, M.D.*, Professor of Orthopaedic Surgery, and Chief of the Fracture Service, Hahnemann Medical College and Hospital, Philadelphia. Fellow of the American College of Surgeons, Fellow of the American Academy of Orthopaedic Surgeons, Fellow of the American Association for the Surgery of Trauma, Diplomate of the American Board of Orthopaedic Surgery. Second edition. Cloth. Price, \$3.00. Pp. 220, illustrated. The Williams & Wilkins Company, Mount Royal and Guilford Ave., Baltimore 2, Md., 1948.

This is the second edition of a valuable monograph on the methods of using plaster of Paris for effective immobilization. In the text the author presents the plaster bandage and pattern plaster techniques of the application of plaster of Paris in adequate detail, and discusses the errors and difficulties that are most frequently encountered. The use of plaster of Paris in war surgery, compound fractures, osteomyelitis and soft tissue injury is dealt with as special subjects.

In this edition the text and figure legends have been revised and brought up to date. The illustrations have been rearranged in a more convenient sequence and many new illustrations have been added.

This monograph is highly recommended as a guide for the instruction of both graduate and undergraduate medical students in the art of proper plaster techniques.

INFRA-RED RADIATION. *William Beaumont, M.R.C.S. (Eng.), L.R.C.P. (Lond.)*, Director of Physical Medicine, Westminster Hospital, Medical Director, Institute of Ray Therapy, Examiner, Chartered Society of Physiotherapy. With a Foreword by Lord Horder, G.C.V.O., M.D., F.R.C.P. Third Edition. Pp. 162, 32 illustrations. Price, 8s. 6d. net. H. K. Lewis & Co., Ltd., 136 Gower Street, London, W.C. 1, 1948.

This book, according to the author, has been written for those who have only a superficial knowledge of physics or the sciences on which medical treatment is based. Divided into nine chapters, it discusses terminology, physical bases, physiologic effects, apparatus, technic, treatment of common symptoms, application to disease, combined treatments and presents and analysis of cases. There has been a complete revision of the entire book, two new chapters have been added and the illustrations brought up to date. The

book can be recommended to those who desire an elementary presentation of the subject.

MORE THAN ARMIES. THE STORY OF EDWARD H. CARY, M.D. By *Booth Mooney*. With an Introduction by Dr. Morris Fishbein. Fabrikoid. Price, \$5.00. Pp. 275, with 2 illustrations. Mathis Van Nort & Co., 2210 Pacific Ave., Dallas 1, 1948.

This is the story of one of the mighty men of American medicine. Leadership in American medicine is not lightly or easily achieved. The physicians who constitute the membership of the county and State medical societies are men who have undergone long periods of education in the basic subjects taught at universities, long periods of education and training in the medical schools, years of apprenticeship in the hospitals and in the laboratories. They have served the people in their homes, in their offices and in the hospitals. When a physician gains a position of eminence in a county medical society, he may be recognized as a man who has met the greatest test that can come to any man, he has been evaluated not only by the public but by his peers. When Dr. Cary came to Dallas, he accepted early the responsibility of the deanship of the medical school. He recognized with the advancement of medical education the desirability of association of a medical school with other institutions of higher education. He led in the movement to make the medical school in Dallas a department of Baylor University. He remained dean of the medical department until 1920 and then became dean emeritus. He had been medical head of the eye, ear, nose and throat department in the medical school and hospital dispensary. During World War I he sent to France the Baylor Unit, and he served as chairman of the medical advisory board in his district. This man is a physician, a distinguished scientist, a medical statesman, a great builder, an educator, an idealist, all combined in the person of one dynamic, driving, courageous and at the same time, gentle, friendly and affectionate human being.

ATOMIC ENERGY. By *Karl K. Darrow, Ph.D.* Being the Norman Wait Harris Lectures Delivered at Northwestern University. Cloth. Price, \$2.00. Pp. 80, with 13 illustrations. John Wiley & Sons, Inc., 440 4th Ave., New York 16; Chapman & Hall, Ltd., 37-39 Essex St., Strand, London, W.C.2, 1948.

Written by a master of exposition, this volume deals with the fundamental aspects of atomic energy in a way that one can understand. It is written in a semi-popular vein. The book is the result of a series of lectures delivered at Northwestern University in 1947. These lectures were given before an audience consisting of persons whose special fields of interest were other than physics. The physiatrist and the general practitioner will find this volume a most valuable addition to their libraries.

DIAGNOSIS OF VIRAL AND RICKETTSIAL INFECTIONS. By *Frank L. Horsfall, Jr.* Cloth. Pp. 153. Price, \$3.75. Columbia University Press, 2960 Broadway, New York 27, 1949.

This small volume represents a symposium of the section on Microbiology of the New York Academy of Medicine held in January, 1948. The latest information on laboratory diagnosis is briefly summarized for the following conditions: influenza, mumps, psittacosis - lymphogranuloma group of viruses, primary atypical pneumonia, neurotropic virus infections, infection with the virus of herpes simplex, rabies, dengue, infectious mononucleosis, typhus (epidemic, murine and scrub as well as Q fever), Rocky Mountain spotted fever and rickettsialpox, and infectious hepatitis. Each chapter is well documented with modern references.

EVALUATION OF CHEMOTHERAPEUTIC AGENTS. By *Colin M. MacLeod, M.D.* Foreword by Gregory Schwartzman. Fabrikoid. Pp. 205. Price, \$4.00. Columbia University Press, Morningside Heights, New York, N. Y., 1949.

This book is the published symposium held by the New York Academy of Medicine's Section on Microbiology. Fourteen articles by different investigators are presented. The first chapters deal with fundamental concepts of bacteriology, for example: Defense Mechanisms of the Host in Relation to Chemotherapy of Acute Bacterial Infection, The Binding of Chemotherapeutic Agents to Proteins and Its Effect on Their Distribution and Activity; The Nature of the Lesion and the Response to Antimicrobial Therapy, etc. The last lectures include the more specific problems such as the evaluation of chemoprophylaxis of streptococcal infections, evaluation of antimalarial drugs, chemotherapy of viral infections, etc. The last two chapters on chemotherapeutic agents for cancer is unusual and interesting. Most of this material on cancer was taken from the studies of the Division of Experimental Chemotherapy of the Sloan-Kettering Institute for Cancer Research.

The purpose of the book is not only the evaluation of the various agents which in this day of rapid changes in therapeutic drugs makes any printed material soon outdated, (an example is in the chapter on Rickettsial diseases where para-aminobenzoic acid is emphasized whereas chloromycetin and aureomycin which apparently had just been introduced at the time the author prepared this chapter is only mentioned as having been "recently become available"), but in the more fundamental reason for the action of different methods or drugs. Such information presents a more rational approach and is not soon outdated.

This is an excellent review of the most recent and authoritative opinions about the various chemotherapeutic and antibiotic agents. It should not only interest the bacteriologist but all students, and this does not mean the undergraduate, but anyone who wishes a better understanding

of the mechanisms of diseases and the defense reactions that occur in the host.

The reference following each chapter are numerous and the latest. In most of the text a number refers to the reference rather than the long list of names of the authors of the articles — a feature which aids in reading and might be practiced more frequently in published articles.

ANNUAL REVIEW OF PHYSIOLOGY. By *Victor E. Hall; Jefferson M. Crismon, and Arthur C. Giese.* Stanford University. Vol. XI. Cloth. Pp. 643. Price, \$6.00. Annual Reviews, Inc., Stanford, California, 1949.

The Annual Review of Physiology is a volume always of value to the progressive physician and the present book is no exception to the rule.

Schechtman of the University of California gives an excellent review of developmental physiology. His review deals mainly with change — the physiology of embryonic differentiation — rather than with functions of an operational manner. One hundred and thirty-six references are reviewed. Catchpole of the University of Illinois College of Medicine reviewed two hundred and six references on the subject of reproduction. The review covers a period from April, 1947 to June, 1948. This review is well done and is full of valuable information. Barker of the College of Medicine, State University of Iowa, reviewed the literature on metabolic functions of the endocrine system. The review covered a period from July, 1947 to June, 1948 and in this time Barker studied over one thousand papers. Of this number 288 papers are discussed. The review is divided with the following subheadings: Hormone effects on tissues; thyroid; pancreas and carbohydrate metabolism; adrenal cortex; adrenal medulla; anterior pituitary growth; parathyroids and calcium metabolism; and the dynamic aspects of biochemistry. An excellent review on the liver is given by Hoffbauer of the University of Minnesota. The literature on the digestive system is reviewed ably by Thomas and Freidman of Jefferson Medical College. A review by Youmans of University of Oregon on visceral functions of the nervous system will prove of great interest to physiologists. Magoun of Northwestern reviews in his usual virile manner somatic functions of the nervous system. This chapter should be read by physiologists. Another chapter of great interest to the physiologist is bioelectric potentials in the nervous system and muscle by Lloyd and McIntire of the Rockefeller Institute. The electrical activity of the brain is reviewed by Walter and Walter of the Burden Neurological Institute of Bristol, England. Students of electroencephalography will find this a stimulating chapter. Other important reviews to the physiologist is one on Muscle by Sandow, the Peripheral Circulation by Ogden and Hall, Radiation by Nims and Permeability by Teorell of Sweden. It is to be regretted that the subject of Heat and Cold had to be omitted due to the untimely death of Dr. Haterius. It is also

to be regretted that a section on Cutaneous Sensation promised by Assistant Commissar N. Propert-Graschenkor of Russia had to be omitted because it failed to reach the editors.

Every physiatrist should have this valuable review of physiology on his desk for it is full of useful clinical information and gives one the leading trends in the field of medical research.

PHYSIOLOGY OF MOTION DEMONSTRATED BY MEANS OF ELECTRICAL STIMULATION AND CLINICAL OBSERVATION AND APPLIED STUDY OF PARALYSIS AND DEFORMITIES. By G. B. Duchenne. Translated and edited by Emanuel B. Kaplan, M.D., Associate Orthopedic Surgeon of the Hospital for Joint Diseases and Lebanon Hospital, New York City; Fellow of the American College of Surgeons; Member of the American Academy of Orthopedic Surgeons; Member of the American Association of Anatomists; Instructor in Anatomy, College of Physicians and Surgeons, Columbia University. Leather. Pp. 612 with 101 figures drawn after Nature. Price, 18.00. J. B. Lippincott Co., East Washington Square, Philadelphia, 1949.

The medical profession is greatly indebted to both the publishers and translator—Dr. Kaplan—for the production of this valuable work.

Dr. Kaplan writes an excellent introduction reviewing the life work of Duchenne. He states how in 1835 Duchenne became interested in the application of the faradic current in the treatment of various diseases using at first platinum needle electrodes inserted into the tissues but later discovered that electrodes applied to the surface of the skin were sufficient. He early recognized the possibilities of this method in diagnosis and treatment. The present book first appeared in 1867. It was translated into German in 1885 but until now it was never translated into English. Undoubtedly, this was in part due to the fact that the period was not quite ready for the abundant new ideas and findings of Duchenne. The action of individual muscles and groups of muscles was of relatively little importance. A tremendous change in the treatment of muscles, tendons, and nerve injuries has taken place since the time of Duchenne. Dr. Kaplan believes this book may be placed among the greatest books of all times because it contains an excellent record of the kinesiology of the entire muscular system, with few exceptions, investigated by one observer whose genius, perseverance and originality permitted him a deeper insight into the action of muscles, than given to many of his predecessors and perhaps, more modern investigators in this field. The reviewer is in entire agreement with this view. While this book was written a long time ago, it is just as modern as though written but yesterday.

It is a book that should be in the hands of every physiatrist and physical therapist. Both groups will find it of great practical value. It is an untapped treasure of important information.

Duchenne made his studies on the living normal man, on extremities which were amputated and stimulated after rapid dissection while the muscles were still able to respond to electrical stimulation. In addition, he correlated these finds with clinical observations. This research was supplemented by numerous experiments on animals and by careful anatomic dissections.

The book is divided into four parts. The first two parts study motion of the thoracic and abdominal extremities. It considers the individual action and activity of muscles which move (1) the shoulder, (2) the arm, (3) the forearm, (4) the hand, fingers and thumb, (5) the thigh, and (6) the leg, foot and toes. The third part describes the motion of respiration and the vertebrocranial column. Part four deals with motions of the face.

This volume is a tribute to the publisher's art and the publisher is to be congratulated in producing such a beautiful volume.

PHYSICAL EDUCATION: INTERPRETATIONS AND OBJECTIVES. By Jay B. Nash, Ph.D., Chairman of the Department of Physical Education and Health, School of Education, New York University. Fabrikoid. Pp. 288. Price, \$3.00. A. S. Barnes & Company, 67 W. 44th St., New York 18, 1948.

The author states this volume is the accumulated experiences in a twenty year period of teaching courses in the interpretations and objectives of physical education. He defines the place of education in a democracy, the specific contributions of physical education to general educational objectives, the relationships between physical education as a teaching subject and democratic outcomes in terms of health, recreation and citizenship. Nash assumes that a full educative subject matter should contribute to a four level concept of man: Man as a functioning organism, man as a skillful organism, man as a thinking organism, and man as an emotional organism. The book is of particular value to students majoring in physical education. School administrators will find valuable material enabling them to familiarize themselves with what should be expected from a prescribed or elective program in this field.

The volume is written in an interesting style. Part three is perhaps the best section of the book, dealing with body resources for accommodation, organic development, neuromuscular development and emotional development. The book will hold little interest to the physiatrist or physical therapy technician unless particularly interested in the field of physical education.

PHYSICAL MEDICINE ABSTRACTS

Electrodiagnosis of Lesions of Peripheral Nerves in Man. Lewis J. Pollock; James G. Golseth; Frank Mayfield; Alex. J. Arieff, and Y. T. Oester.

Arch. Neurol. & Psychiat. 60:1 (July) 1948.

Since World War I, no new or additional methods of stimulating nerve or the nerve-muscle complex have been discovered. However, there has been developed apparatus by means of which accurate measurement of the amperage and duration of currents which are passed through muscles may be made, and, in fact, predetermined; the wave form and periodicity of current desired are made possible by electronic devices, and artefacts due to changes in resistance of the tissue are obviated.

The authors describe the characteristics of the response of muscle to all the stimuli which were studied. Thus, they were enabled to define a formula for each of the states of muscle studied: normal, degenerating, denervated, regenerating and recovered states, and unsatisfactory or minimal neurotization, including spontaneous regeneration.

The Human Electromyogram in Response to Nerve Stimulation and the Conduction Velocity of Motor Axons: Studies on Normal and on Injured Peripheral Nerves. Robert Hodes; M. G. Larrabee, and W. German.

Arch. Neurol. & Psychiat. 60:340 (Oct.) 1948.

Muscle action potentials in response to supra-maximal percutaneous stimulation of various nerves were recorded in a number of normal subjects, in patients with peripheral nerve injuries and in a few persons with a condition diagnosed as hysterical paralysis. The potentials were recorded through small electrodes on the skin. Convenient electrodes and supports were devised for recording from all the major muscle groups in the forearm, hand, leg and foot. Control observations were made to determine the limitations of the method, particularly those due to the wide spread of the action potential of each muscle. Decrease in amplitude of the action potential after nerve injury indicated decrease in the number of muscle fibers innervated, while increase in latency of the response indicated slowing of the conduction velocity of the regenerating nerve fibers and, therefore, a decrease in axonal diameter.

After nerve suture, muscle action potentials in response to stimulation of the nerve were first detectable at a time which depended on the distance from the lesion to the muscle. The values indicated rates of regeneration in good agreement with the commonly accepted rates of 1 to 2 mm.

per day. In general, reinnervation could be detected before an action potential could be recognized by watching for movement during a voluntary effort of the patient.

For the later stages of recovery, it was convenient to plot the percentage of the normal amplitude of action potential against the number of months allowed for recovery divided by the distance from the lesion to the muscle. Against this abscissa, recovery was found to occur at more or less comparable rates in various sutured nerves. In comparison, those nerves which did not require operation recovered their function at a wide variety of rates, often much more rapidly than after the most favorable suture. By comparison with data such as these, it should be possible to tell whether recovery is lagging unduly in any case of peripheral nerve injury in which a similar electromyographic examination is made.

In cases of hysteria or malingering the normality of the peripheral nerve and muscle could be definitely demonstrated.

The Role of the Sympathetic Nervous System in Acute Poliomyelitis: Preliminary Report. Emil Smith; Philip Rosenblatt, and Andrew B. Li-mauro.

J. Pediat. 34:1 (Jan.) 1949.

The authors have presented clinical evidence showing that sympathetic nervous system involvement in acute poliomyelitis may manifest itself in the cervical region by Horner's Syndrome, in the thoracic region by spasm of the pulmonary blood vessels with dilatation and irregularity of the right side of the heart, in the gastric region by pylorospasm, in the intestinal region by constipation or diarrhea, in the rectal region by intestinal obstruction, in the bladder region by retention or incontinence of urine and in the skin by angio-paresis or spasm.

Presumptive evidence has been presented to show that the blood vessels in the chronic poliomyelitic extremity behave and respond similar to the angio-spasm of Raynaud's disease or the cramp-like pain in intermittent peripheral arterial claudication.

The authors have demonstrated that short wave diathermy with the rhythmic constrictor dilated the blood vessels and increased the blood supply to the extremity. The muscles relaxed and the pain diminished or subsided only to return when the blood vessels contracted.

However, they feel that neither short wave diathermy nor hot packs are the solution for the relief of the muscle spasm and pain in acute poliomyelitis, since these methods do not produce sustained vasodilatation. The method of choice

would be a drug that could be administered by mouth, subcutaneously, or by the intravenous route.

They fully understand that the subject matter in this paper is debatable. However, they hope that it will provoke others to investigate further the role of the sympathetic nervous system in acute poliomyelitis, and that it will eventually lead to a better understanding of the clinical picture of the disease and hence to a more scientific therapeutic approach.

Reaction of the Body to Poliomyelitis and the Recovery Process. Arthur C. Buyton.

Arch. Int. Med. 83:27 (Jan.) 1949.

The established principles regarding the etiology, pathogenesis and pathology of poliomyelitis have been briefly presented. Relation of the pathologic physiology to symptoms has been more thoroughly discussed, and personal experience as a patient with poliomyelitis has been invoked in explaining several poorly understood symptoms. It is postulated that the pain, tenderness and muscle shortening are probably due to a generalized vasospastic condition secondary to lesions in the medulla. The process of recovery is discussed, with particular emphasis on the arborization of peripheral nerves. A regimen of treatment based on physiologic concepts of the disease has been briefly presented.

The Destruction of Retinal Angiomas by Diathermy. Philip Meriwether Lewis.

J. Tennessee M. A. 42:75 (March) 1949.

Two patients with single angiomas of the retina were treated by coagulation with diathermy. Postoperative observation extended for six and one-half years and three and one-half years, respectively. The first case was too far advanced to restore vision, but an eyeball that retains a little sight and which appears practically normal constitutes a worthwhile result. The second case resulted in perfect function and appearance. It is felt that the destruction by diathermy is at present the best method of dealing with the retinal angiomas. If undertaken at an early stage the prognosis is good.

Activation of Human Nerves by Hyperventilation and Hypocalcemia. Neurologic Mechanism of Symptoms of Irritation in Tetany. Eric Kugelberg.

Arch. Neurol. & Psychiat. 60:143 (Aug.) 1948.

In a series of 14 cases of the bulbar type of acute poliomyelitis in which autopsy was performed, hemorrhagic lesions were observed to be common, both grossly and histologically. Such hemorrhages associated with acute poliomyelitis are considered to be unrelated to the basic degenerative and inflammatory process in this disease. The hemorrhages are believed to be a terminal phenomenon, resulting from extreme venous dilatation produced by a combination of factors: (a) the peculiar anatomic relations of the vertebral venous system, favoring stasis; (b) the

force of gravity; (c) anoxia, and (d) injury to the walls of veins produced by degenerated products of the brain. An additional factor is post-mortem manipulation.

The Postural Pains of Pregnancy. Part I — Parietal Neuralgia of Pregnancy. Lowell F. Bushnell.

West J. Surg. 57:123 (March) 1949.

The description, diagnosis and treatment of a postural pain of pregnancy has been presented. Adequate application of these findings will make pregnancy more comfortable in many women, but more advice on posture and physical exercise prior to the age of parturitive activities will be of benefit to the future obstetrical patient.

Vitamin D Intoxication Due to Ertron: Report of Two Cases. Charles K. Donegan; Addison L. Messer, and Edward S. Orgain.

Ann. Int. Med. 30:429 (Feb.) 1949.

The deleterious effects of large doses of vitamin D, although well established, have not received sufficient emphasis in the therapy of those chronic conditions, notably arthritis, for which prolonged administration of the drug has been suggested.

Ertron is prepared by the electrical activation of heat vaporized ergosterol (Whittier process). The possible toxic effects have been minimized by its manufacturer who has stressed persistently a difference in toxicity between vitamin D produced by the electrical activation of heat vaporized ergosterol (Ertron) and that produced by ultraviolet irradiation.

Two cases of Ertron (activated steroids, Whittier process) poisoning are reported to emphasize that the prolonged administration of massive doses of antirachitic substances may produce disturbances in calcium-phosphorus metabolism with serious renal damage. Ertron therapy, therefore, is potentially dangerous.

If massive doses of such drugs are to be used in the treatment of arthritis, frequent observations must be made upon the hemoglobin, urine, renal function tests and calcium and phosphorus blood serum levels in order to detect early intoxication and to prevent irreversible tissue changes.

In all instances of hypercalcemia, vitamin D intoxication should be considered in the differential diagnosis.

Physical Therapy Unit That Ingenuity Built. A. H. Brittingham.

Mod. Hosp. 72:68 (April) 1949.

A detailed floor plan of the physical therapy section is shown. The treatments are all prescribed by the physician and may extend over a period of days, weeks, months or even years. If swelling, pain and lack of motion occur following removal of casts, a series of physical medicine treatments is ordered. These treatments consist of heat followed by massage and manipulation.

Scoliosis and Cardiac Failure. T. Hill.

Am. Heart J. 37:435 (March) 1949.

How deformity of the chest results in pulmonary cardiac failure is not fully understood, but there is much to indicate that reduction of thoracic volume and faulty respiratory mechanics are chiefly responsible. The size of the lungs is limited by the small thoracic volume, and their effective size is further reduced by atelectasis and emphysema. To this static handicap is added the limitation of respiratory movement resulting from skeletal deformity and from weakness and poor mechanical effectiveness of the muscles of respiration.

Deficiencies in thoracic volume and respiratory excursion may have numerous secondary effects. The smaller size of the lungs reduces absolutely both the amount of air and blood which they can contain and the area of the interface where exchange of gases between air and blood can occur. Diminished respiratory excursion limits the normal inspiratory increase in the capacity of the lungs for air and blood and the normal increase in area of the interface. The increased breathing effort exerted in overcoming mechanical handicaps and maintaining gaseous exchange accounts for the characteristic dyspnea of severely scoliotic patients.

Treatment of Poliomyelitis Involving the Respiratory System. Harold E. West, and Albert Bowler.

Am. J. Med. Sci. 217:252 (March) 1949.

The management of patients suffering from poliomyelitis with respiratory involvement requiring the use of a respirator has been presented. The indications for, and the type of tracheotomy preferred, have been described. The value of performing an early tracheotomy has been stressed. Prevention of mechanical difficulties which arise from time to time in the management of patients suffering from acute poliomyelitis and in a respirator, cannot be over-emphasized. Adequate nursing care is essential. In the opinion of the authors the treatment described definitely has reduced mortality at least 50 per cent in cases of acute bulbar poliomyelitis in the respirator and having had a tracheotomy performed.

Hair and Scalp Treatments and Preparations. A Report from the Committee on Cosmetics.

J. A. M. A. 139:840 (March 26) 1949.

The hair "tonics" usually are applied with massage, which is claimed to increase the circulation, thereby stimulating cell activity and, consequently, favorably influencing the growth of hair. There is no proof that the temporary increase in blood supply to the area massaged postpones the loss of hair or in any other way influences baldness. One firm suggests the massaging of only certain areas of the scalp, supposedly at those sites where

the larger blood vessels enter the scalp. Another suggests massaging with the head lower than the waist. In addition to the fact that there is no scientific basis for these theories, over a period of years actual use has proved their worthlessness.

Other firms employ mechanical devices such as electric brushes, vibrators or a suction apparatus for the purpose of increasing circulation. The failures are the same as with manual massage.

In rare instances, continued massage may produce a fine colorless fussy down similar to that seen on the heads of some newborn babies. Alert firms are quick to capitalize on this fact by advising their patrons to observe the condition of their scalps under a bright light for the presence of this fuzz on the theory that this is the beginning of a real growth of hair. This fuzz cannot be considered either in length or appearance to be a real growth of hair or a precursor. Frequently, after reaching a length of about $\frac{1}{8}$ inch (1.27 cm.) the fuzz drops off and is not replaced. In any event, its appearance is without cosmetic value, since it is invisible except on close well lighted inspection.

No matter how illogical or unscientific the basic principles, any new treatment which has public appeal and which has any degree of practicality will eventually be tried in the treatment of baldness. Therefore, ultraviolet lamps enjoy some popularity. In trained hands, ultraviolet rays have some usefulness, but only those whose scientific background makes them capable of understanding the limited available data and the potential health hazards should undertake the supervision of such treatments.

Effect of Muscular Exercise on Dark Adaptation. John P. Wendland.

Am. J. Ophth. 31:1429 (Nov.) 1948.

Twenty-nine subjects were used, on whom 60 tests were performed, in studying the effect of light and heavy muscular exercise upon both the rate and final rod threshold of dark adaptation. Light exercise has essentially no effect upon the rate of dark adaptation and only a tendency to produce a slight biphasic response in the rod threshold. For practical purposes it may be said to exert no effect on dark adaptation.

Heavy exercise produces a tendency to elevation of the thresholds of the total dark-adaptation curve and causes a marked biphasic response in final rod thresholds. The biphasic response consists in, first, a lowering of the threshold of short duration, followed by a rise in the threshold, often of considerable magnitude and of longer duration. In one subject, the depression of sensitivity was equal to that produced in an individual at an altitude of 15,000 feet. In practical application, heavy exercise may be said to produce a definite decrease in ability to see at night. The factors responsible for these observations have been discussed and the importance of the changes in critical visual tasks performed at night pointed out.

Ruptures of Muscles and Tendons: With Particular Reference to Rupture (or Elongation of Long Tendon) of Biceps Brachii With Report of Fifty Cases. Richey L. Waugh; Thomas A. Hathcock, and J. Elliott.

Surgery 25:370 (March) 1949.

The subject of ruptures of muscles and tendons, with particular reference to rupture of the biceps brachii, is reviewed and discussed together with a report of 50 cases of rupture of the biceps brachii personally observed during a fourteen-year period. Ruptures of the biceps brachii often go unrecognized and untreated. This is due to the fact that many general practitioners and surgeons are not familiar with the condition. Mistaken diagnoses include conditions such as strain or sprain of shoulder, rupture of supraspinatus tendon, subdeltoid bursitis, arthritis, periarthritis, neuritis and rupture of blood vessels. The increasing frequency of occurrence or rather diagnosis is due to the continued "biceps mindedness" in the diagnosis of shoulder conditions by staff members. The 50 cases of rupture of biceps brachii include rupture of the long tendon, ruptures at the musculotendinous junction, and ruptures (avulsion) of the distal tendon. Twenty-nine of the 50 patients with rupture of the biceps brachii were subjected to operation. The results following operation were satisfactory in all but one case. The character of treatment depends upon the degree and site of the rupture and the age and occupation of the patient. However, in most instances operation is the method of choice. The various types of operation for ruptures of the biceps brachii are discussed in detail.

Current Poliomyelitis Research. Hart E. Van Riper.

Delaware State M. J. 21:29 (Feb.) 1949.

In a disease as variable in its clinical course as poliomyelitis is, the evaluation of any therapy is a difficult task. To be of any statistical value, the series of cases treated must be large. But this is not the only requirement. The test must be made under conditions that will allow a valid comparison between two groups, treated and untreated, but otherwise similar. In attempting such a comparison we must remember that the disease varies in severity not only from case to case but from one outbreak to another. We probably cannot, in dealing with human patients, set up such rigid controls as any biologist would consider necessary in a similar experiment on animals, but we should conform to that ideal as nearly as possible, and in proportion as we fall short of it we should be cautious in drawing conclusions.

Research is being directed toward finding methods of prevention as well as treatment. One approach is to trace the life history, distribution and means of spread of the virus, in the hope that sources of infection can be eliminated. It is known

that the virus multiplies in the human body, but have found no evidence has been found that it does so anywhere else under natural conditions. Virus is given off from the infected human body mainly by way of the bowel. While it may be present in nasopharyngeal secretions, there is little direct evidence that significant amounts of it escape by way of the mouth or nose. It can survive outside the body for long periods of time, but we do not know how it is transmitted from person to person. There frequently is a history of contact with same recognized case. But even if infection does result from contact, we still do not know the precise mode of transfer of the virus. The word "contact" covers a variety of situations, with an equal variety of possible agencies of transfer. Flies are known to be occasional carriers of virus, but we do not know how many human infections, if any, can be attributed to them.

The second possible method of prevention is to increase individual resistance to infection, either by vaccination or by some other form of prophylaxis. The virus of poliomyelitis is one of the most difficult of all pathogenic agents to handle in the laboratory. That is because of its peculiar choice of host animals.

The Effect of Handometer Exercise Upon Normal Grip Strength. Eleanor M. Larsen.

Federation Proc. 8:91 (March) 1949.

The usual grip strength of normal individuals is determined largely by their occupation. If normal grip strength may be increased by Handometer exercise, the hand strength of individuals weakened by injury or disease might be expected to improve by employing the same method. The purpose of this investigation was to determine the effect of Handometer exercise upon normal grip strength. The usual hand strength of 14 young adult women, right-handed with one exception, was measured by a grip dynamometer before and after 20 bouts of work performed bi-weekly. The exercise apparatus was the Handometer which consists essentially of a sphygmomanometer-type hand bulb attached to an adjustable air-pressure system gauge. The work of compressing the bulb against a constant resistance of 30 lb. pressure was continued at the rate of 60 contractions per minute until the needle could no longer be held constant. The number of contractions were counted and recorded for each hand. The results for every subject consist of 3 grip dynamometer readings for each hand pre- and postexercise, and 20 sets of Handometer data for each hand. The grip dynamometer data were analyzed statistically. The results indicate that the usual right hand grip strength is stronger than the left; and that the Handometer exercise increased the grip strength in both right and left hands, with a slightly greater increase in the strength of the left hand.

PRELIMINARY PROGRAM

TWENTY-SEVENTH ANNUAL SCIENTIFIC SESSION

AND

INSTRUCTION SEMINAR

American Congress of Physical Medicine

September 6, 7, 8, 9 and 10, 1949

NETHERLAND PLAZA

CINCINNATI, OHIO

SCHEDULE OF INSTRUCTION SEMINAR

TUESDAY, SEPTEMBER 6

- 10:00 to 10:50—(A) **Functional Anatomy of Shoulder and Arm.** HOLLINSHEAD. Parlor H
- 10:00 to 10:50—(1) **Braces: Anatomic Considerations in Prescribing and Fitting.** WRIGHT. Parlor I
- 11:00 to 11:50—(B) **Functional Anatomy of Hand.** HOLLINSHEAD. Parlor H
- 11:00 to 11:50—(2) **Special Braces to Favor Functional Activity.** WRIGHT. Parlor I
- 3:00 to 3:50—(C) **Therapeutic Exercise: Basic Principles Underlying.** BAKER. Parlor H
- 3:00 to 3:50—(3) **Electrodiagnosis: Clinical Uses and Interpretation of Golseth-Fizell Apparatus.** ROSE. Parlor I
- 4:00 to 4:50—(D) **Therapeutic Exercise: Neuromuscular Basis for.** HINES. Parlor H
- 4:00 to 4:50—(4) **Multiple Sclerosis: Evaluation and Prognosis for Physical Rehabilitation.** KABAT. Parlor I

WEDNESDAY, SEPTEMBER 7

- 8:30 to 9:20—(E) **Functional Anatomy of Hip and Thigh.** HOLLINSHEAD. Parlor H
- 8:30 to 9:20—(5) **Muscular Imbalance: Evaluation and Treatment.** BENNETT. Parlor I
- 9:30 to 10:20—(F) **Functional Anatomy of Lower Leg and Knee.** HOLLINSHEAD. Parlor H
- 9:30 to 10:20—(6) **Research in Brace Making.** YOUNG. Parlor I

THURSDAY, SEPTEMBER 8

- 8:30 to 9:20—(G) **Movement Patterns in Infants and Children.** Parlor H
- 8:30 to 9:20—(7) **Cerebral Palsy (Spastic): Diagnosis and Prognosis.** PERLSTEIN. Parlor I
- 9:30 to 10:20—(H) **Movement Patterns in Infants and Children.** Parlor H
- 9:30 to 10:20—(8) **Cerebral Palsy (Spastic) Patients: Muscle Reeducation.** PERLSTEIN. Parlor I

FRIDAY, SEPTEMBER 9

- 8:30 to 9:20—(J) **Recent Developments in Physiology of Exercise.** HELLEBRANDT. Parlor H
- 8:30 to 9:20—(9) **Development of a Rehabilitation Center.** COVALT. Parlor I
- 9:30 to 10:20—(K) **Application of Electrical Principles to Vascular and Cardiovascular Problems.** JOCHIM. Parlor H
- 9:30 to 10:20—(10) **Muscle Strength Testing: Method, Interpretation and Importance in Evaluation for Rehabilitation.** KNAPP. Parlor I

LECTURERS FOR INSTRUCTION SEMINAR

- FRANCES BAKER, M.D.,** Director, Kabat-Kaiser Institute, Oakland, Calif.;
- ROBERT L. BENNETT, M.D.,** Director of Physical Medicine, Georgia Warm Springs Foundation, Warm Springs, Ga.;
- DONALD A. COVALT, M.D.,** Associate Professor, Physical Medicine and Rehabilitation, New York University, New York, N. Y.;
- FRANCES A. HELLEBRANDT, M.D.,** Director, Barnard Center of Physical Medicine, Medical College of Virginia, Richmond, Va.;
- HARRY M. HINES, Ph.D.,** Professor, Department of Physiology, College of Medicine, State University of Iowa, Iowa City, Ia.;
- W. HENRY HOLLINSHEAD, Ph.D.** (by invitation), Professor of Anatomy, Mayo Foundation, University of Minnesota and Head of Section on Anatomy, Mayo Clinic, Rochester, Minn.;
- KENNETH E. JOCHIM, Ph.D.** (by invitation), Professor and Chairman, Department of Physiology, University of Kansas, School of Medicine, Lawrence, Kan.;
- HERMAN KABAT, M.D.,** Medical Director, Kabat-Kaiser Institute for Neuromuscular Rehabilitation, Oakland, Calif.;
- MILAND E. KNAPP, M.D.,** Clinical Associate Professor of Radiology and Physical Medicine, University of Minnesota, Minneapolis, Minn.;
- MEYER A. PERLSTEIN, M.D.** (by invitation), Department of Pediatrics, Northwestern University Medical School, Chicago, Ill.;
- DONALD L. ROSE, M.D.,** Assistant Professor of Physical Medicine, University of Kansas School of Medicine, Kansas City, Kan.;
- JESSIE WRIGHT, M.D.,** Medical Director, D. T. Watson School of Physiatrics, Leedsdale; Pittsburgh, Pa.;
- JOHN L. YOUNG, Ph.D.** (by invitation), Fellow in Research on Orthopedic Appliances, The Sarah Mellon Scife Foundation, Mellon Institute, Pittsburgh, Pa.

GENERAL INFORMATION

RULES GOVERNING THE READING OF PAPERS

No paper or address before the Congress shall occupy more than fifteen minutes in its delivery. The program is so arranged that all the time is utilized and it is therefore imperative that the stated time schedule is closely followed. All papers read before the Congress shall be the property of the Congress for publication in the official journal. Each paper shall be deposited with the secretary of the section when read.

THE CONVENTION

The registration desk will be open at 10:00 a. m., Monday, September 5 for pre-convention registration. It is important that everyone register before entering the lecture hall. Those not wearing the official badge will be refused admission. This meeting is not open to the public. No registration fee will be charged.

BUSINESS SESSIONS

The annual business meetings for the members of the Congress will be held Tuesday, September 6, at 8:00 p. m., in Parlors ABC&D, and on Wednesday, September 7, at 5:00 p. m. in the Hall of Mirrors.

CONGRESS DINNER

The annual Congress dinner will be held on Thursday evening, September 8 at 7:00 p. m., in the Pavilion Caprice and dress is optional. Exhibitors and guests are welcome. An interesting but brief after-dinner program has been arranged. You will enjoy this occasion, the only social function of the convention.

THE INSTRUCTION SEMINAR

Courses are offered in two separate groups: One group, designated by letters, consists of ten lectures on basic subjects. Physicians only will be permitted to register for this group of lectures. A second group of ten lectures, designated by numerals, will present more general and clinical subjects. Physicians as well as physical therapists who are registered with the American Registry of Physical Therapy Technicians will be permitted to register for these courses. Note: Members in good standing of the American Occupational Therapy Association are eligible to enroll for the instruction course.

The instruction course will be given from 10:00 to 10:50 and 11:00 to 11:50, Tuesday morning, September 6; from 3:00 to 3:50 and 4:00 to 4:50, Tuesday afternoon, September 6. It will continue at 8:30 to 9:20, and 9:30 to 10:20, the mornings of Wednesday, September 7; Thursday, September 8 and Friday, September 9. This schedule will enable attendance at both the course and scientific sessions.

Each registrant for the course is allowed the choice of one lecture during a period. The charge for the complete schedule of ten lectures is \$15.00. Less than ten lectures may be scheduled at \$2.00 per lecture. The right is reserved to reject any application if the Course Committee finds it desirable to do so. Registration for specific courses cannot be guaranteed when quotas are filled.

Those who have not completed their registration for the course should do so before attending any of the lectures. No one will be admitted to any of the course lectures without the official registration card for the course. Registration for the course may be completed on Monday, September 5, starting at 10:00 A. M. and continuing throughout the week starting at 8:00 A. M. at the main registration desk of the Congress.

AMERICAN SOCIETY OF PHYSICAL MEDICINE

The American Society of Physical Medicine will hold its annual meeting, dinner, 6:30 P. M., in Parlors ABC&D, Friday, September 9.

EDUCATIONAL CONFERENCE

An entire day has been set aside for the educational conference, Tuesday, September 6, opening at 10:30 a. m., there will be a conference for physicians; at 12:30 p. m., the consultants to the Council on Physical Medicine and Rehabilitation will meet. The conference, which this year is limited to physicians, will resume at 2:30 p. m.

SCIENTIFIC EXHIBITS

Scientific exhibits will be on display again and should prove of great interest. As was the custom formerly, medals will be awarded to those exhibits which are adjudged the outstanding ones by the committee on scientific awards and will be announced at the annual Congress dinner, Thursday, September 8.

TECHNICAL EXHIBITS

The program of the scientific sessions and instruction course has been arranged with intermission periods to give time for visits and inspection of the technical exhibits. As these exhibits have been arranged with considerable effort, we urge every member and guest to set aside sufficient time for a complete tour of all exhibits. Exhibits will be open from 8:00 a. m. to 6:00 p. m.

EDITORIAL BOARD

The annual meeting of the Editorial Board will be held Monday, September 5, 8:30 a. m., Breakfast, Parlor K.

AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS

The annual meeting of the Boards of the Registry will be held Monday, 12:30 p. m., luncheon, Parlor G.

APPLICATION FOR INSTRUCTION SEMINAR

In Conjunction with the
27th Annual Scientific and Clinical Session
of the

AMERICAN CONGRESS OF PHYSICAL MEDICINE

September 6, 7, 8 and 9, 1949
Netherland Plaza, Cincinnati, Ohio

Name
(Please print)

Address
(Please print)

(If physician, please answer)
Member A.M.A. Member County Medical Society

(Give Name)

If Government Service state briefly

(If technician, please answer.
Note: Only members in good standing of the American Registry of Physical Therapy Technicians, or the American Occupational Therapy Association are eligible to attend.)

Make up schedule in space below, listing courses by hour, day and number (watch, please do not duplicate):

Signature in ink.

Date

Please make check payable to and mail it with your application to

American Congress of Physical Medicine
30 North Michigan Avenue Chicago 2, Illinois

GENERAL SCIENTIFIC SESSION

Sponsored by the American Society of
Physical Medicine

WEDNESDAY, September 7 — 10:30 A. M.

Pavillon Caprice

OFFICERS OF THE SECTION

Chairman — WALTER McCLELLAN, Saratoga Springs, N. Y.
Secretary — ISADORE LEVIN, Washington, D. C.

10:30 The Effect of Short Wave Current Heating on Digital Circulation as Determined by Microplethysmography.

BRUCE B. GRYNBAUM, M.D., Fellow in Physical Medicine, Mt. Sinai Hospital, New York, N. Y.;

RAYMOND S. MEGIBOW, M.D. (by invitation), Adjunct Physician, Mt. Sinai Hospital, New York, N. Y.,
and

WILLIAM BIERMAN, M.D., Assistant Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York, N. Y.

10:50 A Comparative Study of the Temperature Gradients Produced by Various Thermogenic Agents.

HARRY M. HINES, Ph.D., Professor and Head of Department of Physiology, College of Medicine, State University of Iowa;

ALMA J. MURPHY, M.S. (by invitation), Research Assistant, Department of Physiology, College of Medicine, State University of Iowa,
and

WILLIAM D. PAUL, M.D., Associate Professor of Medicine and Chairman of the Division of Physical Medicine, College of Medicine, State University of Iowa, Iowa City, Ia.

Discussion of foregoing papers: Frederic T. Jung, M.D., Chicago.

11:10 The Effects of Microwave Diathermy on the Eye: An Experimental Study.

LOUIS DAILY, JR., M.D. (by invitation), Fellow in Ophthalmology, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation;

JULIA F. HERRICK, Ph.D. (by invitation), Associate Professor of Experimental Medicine, Institute of Experimental Medicine, Mayo Foundation;

EDITH M. PARKHILL, M.D. (by invitation), Assistant Professor of Pathology, Mayo Foundation and Consultant in Surgical Pathology, Mayo Clinic,
and

WILLIAM L. BENEDICT, M.D. (by invitation), Professor of Ophthalmology, Mayo Foundation and Head of Section in Ophthalmology, Mayo Clinic, Rochester, Minn.

11:30 The Effects of Microwaves on Bone, Bone Marrow and Adjacent Tissues.

JOSEPH P. ENGEL, M.D. (by invitation), Fellow in Physical Medicine, Mayo Foundation;

JULIA F. HERRICK, Ph.D. (by invitation), Associate Professor of Experimental Medicine, Institute of Experimental Medicine, Mayo Foundation;

JOHN H. GRINDLAY, M.D. (by invitation), Division of Experimental Surgery, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation,
and

FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

11:50 The Influence of Microwave Diathermy on the Postoperative Course of Swelling and Trismus Resulting from Odontectomy.

ROBERT Q. ROYER, D.D.S. (by invitation), Fellow in Dental Surgery, Mayo Foundation;

STANLEY A. LOVESTEDT, D.D.S. (by invitation), Assistant Professor of Dental Surgery, Mayo Foundation and Consultant in Dental Surgery, Mayo Clinic;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation,
and

FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

Discussion of foregoing papers: Donald L. Rose, M.D., Kansas City, Kan.

GENERAL SCIENTIFIC SESSION

WEDNESDAY, September 7 — 10:30 A. M.

Hall of Mirrors

OFFICERS OF THE SECTION

Chairman — HERMAN L. RUDOLPH, Reading, Pa.
Secretary — OSCAR O. SELKE, JR., Houston, Texas.

10:30 The Swannanoa Plan for the Rehabilitation of Tuberculous Veterans.

BATHURST B. BAGBY, JR., M.D., Chief, Physical Medicine Rehabilitation Service, Veterans Administration Hospital, Otten, N. C.

10:45 Fact-Facing in Rehabilitation.

ROBERT W. BOYLE, M.D., Chief, Physical Medicine Rehabilitation Service, Veterans Administration Hospital, Fort Thomas, Ky.

11:00 The Rehabilitation Board: Its Role in the Rehabilitation Process.

MANDELL SHIMBERG, M.D., Chief, Physical Medicine Rehabilitation, Veterans Administration Regional Office, New York, N. Y.,
and

WILLIAM M. BERNSTOCK, M.A. (by invitation), Chairman, Rehabilitation Board, Veterans Administration Regional Office, New York, N. Y.

11:15 Objective Evidence of the Tonic Neck Reflex Training in Hemiplegia.

LEONARD YAMSHON, M.D., Fellow in Physical Medicine, Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, New York, N. Y.;

OTAKAR MACHEK, M.D. (by invitation), Fellow in Physical Medicine, Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, New York, N. Y.,
and

DONALD A. COVALT, M.D., Associate Professor, New York University, Physical Medicine and Rehabilitation, New York, N. Y.

11:30 The Use of Skin Grafts in Rehabilitation.

BRUCE C. MARTIN, M.D. (by invitation), Instructor, Department of Surgery, Ohio State University, Columbus, Ohio.

11:50 Suction Socket Amputees.

JOHN H. ALDES, M.D., Chief, Orthopedic Surgery, Birmingham Veterans Administration Hospital, Van Nuys, Cal.

Discussion of foregoing papers: Sidney Licht, M.D., Cambridge, Mass.; Harold Dinken, M.D., Denver, Colo.

GENERAL SCIENTIFIC SESSION**WEDNESDAY, September 7 — 2:00 P. M.****Hall of Mirrors****OFFICERS OF THE SECTION**

Chairman — O. LEONARD HUDDLESTON, Santa Monica, Calif.
 Secretary — RICHARD KOVACS, New York, N. Y.

**FORMAL OPENING OF THE
 27TH ANNUAL SESSION**
INVOCATION

The Reverend J. Otis Young,
 Rector, The Methodist Church, Cincinnati.

ADDRESSES OF WELCOME

Richard W. Vilter, M.D.,
 Assistant Dean, University of Cincinnati
 College of Medicine.
 David W. Heusinkveld, M.D.,
 President, Cincinnati Academy of Medicine.

**INDUCTION OF PRESIDENT-ELECT
 ADDRESS**
2:25 Education in Physical Medicine.

EARL C. ELKINS, M.D., Rochester, Minn.

2:55 New Horizons for Council on Physical Medicine and Rehabilitation.

HOWARD A. CARTER, M.E., Secretary, Council on Physical Medicine and Rehabilitation, American Medical Association, Chicago.

3:10 Isotopes.

OTTO GLASSER, Ph.D. (by invitation), Biophysicist, Research Division, Cleveland Clinic Foundation, Cleveland, Ohio.

3:45 Experimental Investigation of Methods for Increasing Power Transfer in Microwave Diathermy.

JULIA F. HERRICK, Ph.D. (by invitation), Associate Professor of Experimental Medicine, Institute of Experimental Medicine, Mayo Foundation.

DEMETRIUS G. JELATIS, Sc.D. (by invitation), Engineering Consultant, Institute of Experimental Medicine, Mayo Foundation.

and

GORDON M. LEE, Sc.D. (by invitation), Engineering Consultant, Institute of Experimental Medicine, Mayo Foundation, Rochester, Minn.

A Method for Decreasing Reflection of Micro-waves.

FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic.

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation.

and

JEROME W. GERSTEN, M.D., Fellow in Physical Medicine, Mayo Foundation, Rochester, Minn.

4:05 Present Challenge of Physical Medicine and Rehabilitation in the Veterans Administration.

ALVIN B. C. KNUDSON, M.D., Chief, Physical Medicine Rehabilitation Division, Department of Medicine and Surgery, Veterans Administration, Washington, D. C.

4:25 Accidents in Physical Medicine.

RICHARD KOVACS, M.D., Professor of Physical Medicine, New York Polyclinic Medical School and Hospital, New York, N. Y.

GENERAL SCIENTIFIC SESSION

Sponsored by the American Society of
 Physical Medicine

THURSDAY, September 8 — 10:30 A. M.**Pavillon Caprice****OFFICERS OF THE SECTION**

Chairman — CHARLES O. MOLANDER, Chicago.
 Secretary — GEORGE D. WILSON, Asheville, N. C.

10:30 Measurements of Muscular Strength.

H. HARRISON CLARKE, Ed.D. (by invitation), Director of Graduate Studies, Springfield College, Springfield, Mass.

10:50 Objective Recording of Muscle Power: Preliminary Report.

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation.

JEROME W. GERSTEN, M.D., Fellow in Physical Medicine, Mayo Foundation.

EARL C. ELKINS, M.D., Section on Physical Medicine, Mayo Clinic.

and

GORDON M. MARTIN, M.D., Assistant Professor of Physical Medicine, Mayo Foundation, and Consultant in Physical Medicine, Mayo Clinic, Rochester, Minn.

Discussion of foregoing papers: Robert W. Boyle, M.D., Fort Thomas, Ky.

11:10 Preoperative and Postoperative Electromyographic Observations in Herniated Intervertebral Disks: Preliminary Report.

ALEX HARELL, M.D., Fellow in Orthopedic Surgery, Washington University School of Medicine, St. Louis, Mo.

and

SEDGWICK MEAD, M.D., Assistant Professor, Physical Medicine, Washington University School of Medicine, St. Louis, Mo.

Discussion: William Bierman, M.D., New York, N. Y.

11:30 Facial Paralysis — An Analysis of 500 Cases.

HERBERT W. PARK, M.D. (by invitation), Department of Physical Medicine, Massachusetts General Hospital, Boston, Mass.

and

ARTHUR L. WATKINS, M.D., Associate in Medicine, Harvard Medical School, Chief of Physical Medicine, Massachusetts General Hospital, Boston, Mass.

Discussion: William Schmidt, M.D., Philadelphia.

11:50 An Urgent Challenge for the Physiatrist.

MILTON G. SCHMITT, M.D., Director, Chicago Clinic of Physical Medicine, Chicago.

Discussion: Dean M. Hayes, M.D., Washington, D. C.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 8 — 10:30 A. M.

Hall of Mirrors

OFFICERS OF THE SECTION

Chairman — LOUIS B. NEWMAN, Chicago.
 Secretary — BEN L. BOYNTON, Houston, Texas.

10:30 The Sweating Test in Neurologic Diagnosis.

WILLIAM BIERMAN, M.D., Assistant Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York, N. Y.;

LEONARD I. MALLIS, M.D. (by invitation), Resident Neurosurgeon, Mt. Sinai Hospital, New York, N. Y., and

BRUCE B. GRYNBAUM, M.D., Fellow in Physical Medicine, Mt. Sinai Hospital, New York, N. Y.

10:50 The Treatment of Hyperhidrosis by Electric Current.

HARRY D. BOUMAN, M.D. (by invitation), Professor of Physical Medicine, University of Wisconsin School of Medicine, Madison, Wis.

Discussion of foregoing papers: Karl Harpuder, M.D., New York, N. Y.

11:10 Continuous Tetanizing (Low Voltage) Current for Relief of Spasm.

WALTER J. LEE, M.D., Assistant Professor of Physical Medicine, Medical College of Virginia, Richmond, Va.

11:30 Infrared Heating of Tissues.

FRANCIS X. SWEENEY, M.D. (by invitation), Instructor in Physical Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia, and

STEVEN M. HORVATH, Ph.D. (by invitation), Associate Professor of Physical Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia. Discussion of foregoing papers: Max Newman, M.D., Detroit, Mich.

11:50 A Study of the Effect of Hypnotic Suggestion on Physiologic Performance.

SEDGWICK MEAD, M.D., Assistant Professor, Physical Medicine, Washington University School of Medicine, St. Louis, Mo., and

ELSIE S. ROUSH, M.S. (by invitation), Department of Anatomy, Washington University School of Medicine, St. Louis, Mo.

Discussion: Arthur L. Watkins, M.D., Boston, Mass.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 8 — 2:00 P. M.

Hall of Mirrors

OFFICERS OF THE SECTION

Chairman — WALTER M. SOLOMON, Cleveland, Ohio.
 Secretary — MARGE C. L. MCGUINNESS, New York, N. Y.

2:00 Physiology of Exercise.

LAURENCE E. MOREHOUSE, Ph.D. (by invitation), Departments of Physical Education and Aviation Medicine, The University of Southern California, Los Angeles, Calif.

2:20 The Latent Period of Muscular Contraction.

ALEXANDER SANDOW, Ph.D. (by invitation), Associate Professor of Biology, Washington Square College of Arts and Sciences, New York University, New York, N. Y.

2:40 Physical Medicine and Peripheral Vascular Disease.

FAY A. LEFEVRE, M.D. (by invitation), Associate, Department of Medicine, Cleveland Clinic Foundation, Cleveland, Ohio.

3:00 Disability Evaluation.

EARL D. MCBRIDE, M.D. (by invitation), Associate Professor of Orthopedic Surgery, Oklahoma University School of Medicine, Oklahoma City, Okla.

3:20 A Comparative Study of the Heating of Tissues by Near and Far Infrared Radiation.

JEROME GERSTEN, M.D., Fellow in Physical Medicine, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation;

RICHARD W. STOW, M.A. (by invitation), Fellow in Biophysics, Mayo Foundation, and

FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

3:40 The Influence of Hot Packs on the Peripheral Circulation.

EDWARD M. KRUSEN, JR., M.D., Fellow in Physical Medicine, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation;

URSULA M. LEDEN, M.D. (by invitation), Fellow in Physical Medicine, Mayo Foundation;

GORDON M. MARTIN, M.D., Assistant Professor of Physical Medicine, Mayo Foundation, and Consultant in Physical Medicine, Mayo Clinic, and

EARL C. ELKINS, M.D., Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

4:00 Prevention of Venous Thrombosis and Embolism by Electrical Stimulation of Calf Muscles: Further Study of Clinical Application and Results.

VLADIMIR L. TICHY, M.D. (by invitation), Clinical Instructor in Surgery, Western Reserve University, Cleveland, Ohio, and

HARRY T. ZANKEL, M.D., Chief, Physical Medicine Rehabilitation, Cile Veterans Administration, Cleveland, Ohio.

ANNUAL CONGRESS DINNER

INFORMAL

THURSDAY, September 8 — 7:00 P. M.

Pavillon Caprice

TOASTMASTER: EARL C. ELKINS, M.D.
 President

AWARDS

ARTHUR C. JONES, M.D.
 Chairman, Committee, Gold Key Awards

DONALD L. ROSE, M.D.
 Chairman, Committee, Scientific Exhibits

GENERAL SCIENTIFIC SESSION

Sponsored by the American Society of
Physical Medicine

FRIDAY, September 9 — 10:30 A. M.

North Hall

OFFICERS OF THE SECTION

Chairman — ARTHUR E. WHITE, San Francisco, Calif.
Secretary — DONALD A. COVATT, New York, N. Y.

10:30 The Pharmacologic and Sensitizing Properties of SY-28 When Administered by Ion Transfer.

H. WORLEY KENDALL, M.D., Professor of Physical Medicine, Department of Physical Medicine, University of Illinois College of Medicine, Chicago,

and
ARTHUR A. RODRIGUEZ, M.D., Assistant Professor of Physical Medicine, University of Illinois College of Medicine, Chicago.10:50 The Potassium Permeability and the Capacity for Potassium Storage of Normal and Atrophied Muscle, Investigated with the Radioactive Isotope K⁴².

JOHN W. MOORE, Ph.D. (by invitation), Department of Physics, Medical College of Virginia;

ERNST FISCHER, M.D., Department of Physiology, Medical College of Virginia;

HELEN V. SKOWLUND, M.S. (by invitation), Department of Physiology, Medical College of Virginia;

KATHLEEN W. RYLAND (by invitation), Department of Physiology, Medical College of Virginia,

and
N. JANE COPEHAVER (by invitation), Department of Physiology, Medical College of Virginia, Richmond, Va.

Discussion of foregoing papers: Irvin F. Hummon, Jr., M.D., Chicago.

11:10 A Laboratory Study in Ultrasonic Diathermy. PAUL A. NELSON, M.D., Fellow in Physical Medicine, Mayo Foundation;

JULIA F. HERRICK, Ph.D. (by invitation), Associate Professor of Experimental Medicine, Institute of Experimental Medicine, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation;

EDWARD J. BALDES, Ph.D. (by invitation), Professor of Biophysics, Mayo Foundation, and Consultant in Biophysics, Mayo Clinic,

and
FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

11:30 Electrophoretic Analyses of Plasma Proteins in Rheumatoid Arthritis.

J. I. ROUTH, Ph.D. (by invitation), Associate Professor of Biochemistry, College of Medicine, State University of Iowa;

and
WILLIAM D. PAUL, M.D., Associate Professor of Medicine and Chairman of the Division of Physical Medicine, College of Medicine, State University of Iowa, Iowa City, Ia.

11:50 Local Effects of Microwave Radiation on Tissue in the Albino Rat.

CHARLES S. WISE, M.D., Associate Professor in Physical Medicine, The George Washington University Hospital, Washington, D. C.

Discussion of foregoing papers: Harry M. Hines, Ph.D., Iowa City, Ia.

12:10 The Prevention of Ultraviolet Erythema by Topical Application of Pyrribenzamine.

ABNER KURTIN, M.D. (by invitation), Senior Assistant, Department of Dermatology, Mt. Sinai Hospital, New York, N. Y.;

WILLIAM RIERMAN, M.D., Assistant Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York, N. Y.,

and
BRUCE B. GRYNBAUM, M.D., Fellow in Physical Medicine, Mt. Sinai Hospital, New York, N. Y.

Discussion: Shelby G. Gamble, M.D., Cleveland, Ohio.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 9 — 10:30 A. M.

Hall of Mirrors

OFFICERS OF THE SECTION

Chairman — HANS J. BEUREN, New York, N. Y.
Secretary — SAMUEL A. WARSHAW, Brooklyn, N. Y.

SYMPOSIUM ON HYDROTHERAPY

10:30 The Effect of Contrast Baths on the Peripheral Circulation in Rheumatoid Arthritis.

DONALD J. ERICKSON, M.D., Section on Physical Medicine, Mayo Clinic;

JOSEPH P. ENGEL, M.D. (by invitation), Fellow in Physical Medicine, Mayo Foundation;

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Professor of Physiology and Research Consultant to the Section on Physical Medicine, Mayo Foundation,

and
FRANK H. KRUSEN, M.D., Professor of Physical Medicine, Mayo Foundation, and Head of Section on Physical Medicine, Mayo Clinic, Rochester, Minn.

10:50 Hydrotherapy in Internal Medicine.

JOHN D. CURRENCE, M.D., Associate Clinical Professor of Rehabilitation and Physical Medicine, New York University-Bellevue Medical Center, New York, N. Y.

11:10 Balneotherapy in Arthritis.

EUCLED M. SMITH, M.D., Professor of Internal Medicine, University of Arkansas School of Medicine, Hot Springs, Ark.

11:30 Hydrotherapy in Neurologic and Vascular Problems.

FERDINAND F. SCHWARTZ, M.D., Psychiatrist, Veterans Administration, Birmingham, Ala.

11:50 The Influence of Naturally Carbonated Saline Alkaline Mineral Waters on Gastric Motility and the Secretion of Hydrochloric Acid.

FRANCES A. JELLEBRANDT, M.D., Director, Baruch Center of Physical Medicine, Medical College of Virginia, Richmond, Va.;

SARA JANE HOUTZ, M.S. (by invitation), Research Assistant, Division of Clinical Research, Baruch Center of Physical Medicine, Medical College of Virginia, Richmond, Va.

12:10 Alterations in Peripheral Circulation and Tissue Temperature.

HERMAN FLAX, M.D., Director of Department of Physical Medicine and Rehabilitation, State Insurance Fund, San Juan, Puerto Rico;

RUTH N. MILLER, M.D., Head of Department of Physical Medicine, Christian Buhl Hospital, Sharon, Pennsylvania,

and
STEVEN M. HORVATH, Ph.D. (by invitation), Associate Professor of Physical Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia.

Discussion of foregoing papers: Walter S. McClellan, M.D., Saratoga Springs, N. Y.; Jerome Weiss, M.D., Brooklyn, N. Y.

1:00 A Motion Picture Demonstration of Spinal Cord Involvement of Patients with Poliomyelitis.

FREDERIC J. KOTTKE, M.D., Assistant Professor, Division of Physical Medicine, University of Minnesota Medical School, Minneapolis, Minn.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 9 — 2:00 P. M.

Hall of Mirrors

OFFICERS OF THE SECTION

Chairman — FRANCES BAKER, Oakland, Calif.
Secretary — FREDERIC J. KOTTKE, Minneapolis.

SYMPOSIUM ON POLIOMYELITIS

2:00 Care of the After-Effects of Poliomyelitis on the Forearm and Hand.

LOUIS P. BRITT, M.D. (by invitation), Fellow in Physical Medicine, Georgia Warm Springs Foundation, Department of Physical Medicine, Emory University Hospital, Warm Springs, Ga.

2:15 Care of the After-Effects of Poliomyelitis on the Arm and Shoulder.

KRISTIAN G. HANSSON, M.D., Associate Professor,
Cornell University Medical College, New York, N. Y.

2:30 Care of the After-Effects of Poliomyelitis on the Hip, Thigh and Trunk.

THOMAS GUCKER, III, M.D. (by invitation), Assistant in Orthopedic Surgery, Harvard Medical School, Boston, Mass.

2:55 Care of the After-Effects of Poliomyelitis on the Foot and Leg.

ROBERT L. BENNETT, M.D., Director of Physical Medicine, Georgia Warm Springs Foundation, Professor Physical Medicine, Emory University Medical School, Warm Springs, Ga.

3:10 Measurements of Respiratory Deficiency in Poliomyelitis.

CLARENCE W. DAIL, M.D., Associate Professor, Department of Therapeutics, College of Medical Evangelists School of Medicine, Los Angeles, Calif.

3:25 Intensive Graduated Exercises in Early Poliomyelitis.

ARNO D. GUREWITSCH, M.D., Assistant Attending Physician, Presbyterian Hospital, New York, N. Y.

3:40 A Photographic Study of Abnormalities in Function of Vocal Cords in Bulbar Poliomyelitis.

WILLIAM G. KURICEK, Ph.D. (by invitation), Assistant Professor, Division of Physical Medicine, University of Minnesota Hospitals, Minneapolis, Minn.
Discussion of foregoing papers: Miland E. Knapp, M.D., Minneapolis, Minn.; Hart E. Van Riper, M.D. (by invitation), New York, N. Y.

GENERAL SCIENTIFIC SESSION

SATURDAY, September 10 — 9:00 A. M.

Hall of Mirrors**OFFICERS OF THE SECTION**

Chairman — GEORGE M. PIERSOL, Philadelphia.
Secretary — JESSIE WRIGHT, Pittsburgh.

9:00 Rationale and Use of Muscle Relaxants in Neuromuscular Disorders.

EDWARD B. SCHLESINGER, M.D. (by invitation), Associate in Neurological Surgery, College of Physicians and Surgeons, Columbia University, New York, N. Y.

9:15 Study of the Effect of Unilateral Paralysis of the Lower Extremity on Bone Growth.

GLENN GULLICKSON, M.D. (by invitation), Fellow in Physical Medicine, University of Minnesota Hospitals, Minneapolis, Minn.

9:30 Analysis of Periodic Muscle Activity in Experimental Animals.

GEORGE H. BISHOP, Ph.D. (by invitation), Professor of Neurophysiology, Department of Neuropsychiatry, Laboratory of Neurophysiology, Washington University School of Medicine, St. Louis, Mo.,
and
MARGARET CLARE, R.P.T. (by invitation), Research

Assistant in Physical Medicine and Neurophysiology, Washington University School of Medicine, St. Louis.

9:45 The Measurement of Intracardiac and Intravascular Temperatures and Their Comparison with Rectal Temperature.

LUDWIG W. EICHNA, M.D. (by invitation), Associate Professor of Medicine, New York University College of Medicine, New York, N. Y.;

ADOLPH R. BERGER, M.D. (by invitation), Assistant Professor of Clinical Medicine, New York University College of Medicine, New York, N. Y.,
and

BERTHA RADER, M.D. (by invitation), Assistant in Medicine, New York University College of Medicine, New York, N. Y.

10:00 Some Factors Influencing the Effect of Liquid Borne Ultrasound on Biological Systems.

ROBERT L. BOWMAN, M.D. (by invitation), Assistant in Medicine, New York University College of Medicine, New York, N. Y.

10:15 Studies on Blood Flow Through Deep Tissues.

HARRY M. HINES, Ph.D., Professor, Department of Physiology, College of Medicine, State University of Iowa;

BARBARA L. FEUCHT, R.P.T. (by invitation), Research Assistant, College of Medicine, State University of Iowa;

A. W. RICHARDSON, M.S. (by invitation), Research Assistant, College of Medicine, State University of Iowa,
and

CHARLES J. IMIG, R.P.T. (by invitation), Research Assistant, College of Medicine, State University of Iowa, Iowa City, Ia.

10:30 Electrophoresis of the Water Soluble Proteins of Normal and Atrophied Muscles, Non-Treated and Treated by Daily Electrical Stimulation.

ERNST FISCHER, M.D., Professor of Physiology and Chief of Basic Research Division, Baruch Center of Physical Medicine, Medical College of Virginia;

HELEN V. SKOWLUND, M.S. (by invitation), Research Associate, Department of Physiology, Baruch Center of Physical Medicine, Medical College of Virginia;

KATHLEEN W. RYLAND (by invitation), Research Assistant, Department of Physiology, Baruch Center of Physical Medicine, Medical College of Virginia,
and

N. JANE COPENHAVER (by invitation), Research Assistant, Department of Physiology, Baruch Center of Physical Medicine, Medical College of Virginia, Richmond, Va.

10:45 Attempts to Prevent and Counteract Effects of Ionizing Radiations.

WILBUR A. SELLE, Ph.D., Professor of Medical Physics, Department of Medical Physics and Physiology, Medical Branch, University of Texas, Galveston, Texas.

11:00 Evaluation of Various Modes of Vaginal Heating.

RUTH N. MILLER, M.D., Head of Department of Physical Medicine, Christian Buhl Hospital, Sharon, Pennsylvania;

FRANCIS X. SWEENEY, M.D. (by invitation), Instructor in Physical Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia.

CHARLES DAY, M.D. (by invitation), Chief Resident, Department of Gynecology and Obstetrics, Graduate School of Medicine, University of Pennsylvania, Philadelphia,
and

STEVEN M. HORVATH, Ph.D. (by invitation), Associate Professor of Physical Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia.

SCIENTIFIC EXHIBITS

Rehabilitation of the Chronic Neurologic Patient. LESLIE BLAU, M.D.

The Treatment of Aphasics. ROBERT W. BOYLE, M.D.; HENRY M. MOSER, Ph.D., and EDNA L. PROSSER, B.S.

Physics in Small Doses. HOWARD A. CARTER, M.E., Secretary, Council on Physical Medicine and Rehabilitation, and FREDERIC T. JUNG, Ph.D., M.D., Assistant Secretary, Council on Physical Medicine and Rehabilitation.

Hospital Rehabilitation. FRITZ FRIEDLAND, M.D., and PAUL D. FADEN.

(A) Life and Work of Simon Baruch; (B) Stance Mechanics of the Lower Extremity Amputees. FRANCES A. HELLEBRANDT, M.D.

Studies in Physiology and Physical Medicine at the State University of Iowa: (A) Demonstration-Measurement of Blood Flow; (B) Exhibit-Graduate Program for Physical Medicine and Physical Therapy; (C) Exhibit-Electrophoretic Patterns of Blood Plasma in Rheumatoid Arthritis and Rheumatic Fever. H. M. HINES, Ph.D.; W. D. PAUL, M.D.; A. W. RICHARDSON, Ph.D.; BARBARA L. FEUCHT, R.P.T., M.S., and CHARLES J. IMIG, R.P.T., M.S.

Rehabilitation of the Severely Injured: Bilateral Above Knee Amputees and Paraplegics. HENRY H. KESSLER, M.D.

Rehabilitation of Fractures. FREDERIC J. KOTTKE, M.D., Ph.D.; MILAND E. KNAPP, M.D.; WILLIAM G. KUBICEK, Ph.D.; GLENN GULLICKSON, M.D., and G. K. STILLWELL, M.D.

Cinematographic Recording of Vocal Cord Function Following Bulbar Polioomyelitis. WILLIAM G. KUBICEK, Ph.D., and FREDERIC J. KOTTKE, M.D., Ph.D.

Nationwide Services for the Handicapped. NATIONAL SOCIETY FOR CRIPPLED CHILDREN AND ADULTS.

Self Help Devices in Activities of Daily Living. HOWARD A. RUSK, M.D.; GEORGE G. DEAYER, M.D.; DONALD A. COVALT, M.D., and LEO DOBRIN, M.D.

The Surgeon General, Department of the Army Presents: (A) Physical Medicine Diagnosis and Treatment in Brachial Plexus Nerve Injuries. COL. E. M. SMITH, MC; CAPT. ROBERT J. MURPHY, MC, and CAPT. EDWARD J. LORENZE, MC; **(B) Assisting Devices for Increasing Joint Mobility.** MAJ. JOSEPH N. SCHAEFFER, MC; CAPT. JOHN KEYS, MSC, and M/SGT. DAVID KEITH.

The Comprehensive Care for Cerebral Palsy at All Ages. WILLIAM B. SNOW, M.D.

Therapeutic Possibilities of Microwave Diathermy. R. G. WAKIM, M.D., Ph.D.; JULIA F. HERICK, M.D., and F. H. KRUSEN, M.D.

Braces to Favor Functional Activity. JESSIE WRIGHT, M.D.

TECHNICAL EXHIBITS

THE BIRTCHER CORPORATION.

At the Birtcher Corporation booth will be displayed the new Crystal Bandmaster S. W. Diathermy using the new Triple Induction drum . . . the latest development for administering diathermy by the large area technique, so widely discussed. Also may be seen other units made by Birtcher including the famous Hytreator, the Blentome Portable Electro-surgical Unit and other interesting items. You are cordially invited to visit our booth and meet Mr. Don Maxwell and Mr. Harry McCloud.

THE BURDICK CORPORATION.

The Burdick Corporation will exhibit their physical therapy equipment including the latest models of short wave diathermy, ultraviolet and infrared lamps, galvanic faradic equipment and the Rhythmic Constrictor. Doctors and technicians are invited to visit the Burdick exhibit and to register for the Burdick Syllabus, a periodical of clinical information on physical medicine.

THE DIERKER CO.

The Dierker Company, 6529 Santa Monica Boulevard, Los Angeles 38, California, manufacturers of the Dierker Therapeutic Apparatus for administering treatments and medication to accessible body cavities, will exhibit and demonstrate a new model of the Dierker Apparatus, designed especially for hospitals and where the conservation of space is a factor; also a full line of accessories for use with the Dierker Apparatus.

E & J MANUFACTURING COMPANY.

The E & J Manufacturing Company will demonstrate the latest models of the E & J Resuscitator-Inhalator-Aspirator. Visitors will find these demonstrations unusually interesting as the automatic breathing of the resuscitator phase will be shown in conjunction with a transparent plastic doll in which the actions of the lungs can be viewed.

H. G. FISCHER & CO.

Plan to visit our booth where H. G. Fischer & Co. will display modern, low-priced physical therapy equipment including new FCC type approved short wave diathermy apparatus. Without obligation, see an interesting demonstration of the patented adjustable induction electrode, providing practically all types of diathermy treatment. Your visit will be welcome and appreciated.

HANOVIA CHEMICAL AND MANUFACTURING COMPANY.

Don't fail to see and ask for a demonstration of the Hanovia new Short Wave Diathermy machine—one of the first showings of this new unit. General body and official ultraviolet lamps, Sollux Radiant Heat Lamps as well as black light for diagnostic purposes will also be on display.

HEALTHOMATIC CORPORATION.

Medically prescribed progressive resistance or passive exercises are obtainable with the Professional Model Healthomatic Exercise Apparatus. Designed specifically for Physical Medicine Rehabilitation, this electronically controlled device offers you the selection of muscle groups and finger-tip control of resistance, speed and range of motion.

ILLE ELECTRIC CORPORATION.

Hydromassage Subaqua Therapy Equipment.—Ille Electric Corporation will demonstrate how the care of infantile paralysis, arthritis and other disabling conditions can be greatly improved by the use of Hydromassage Subaqua Therapy Tanks. They will also display an improved Mobile Whirlpool Bath with New Mobile Adjustable High Chair, new improved Paraffin Bath and Mobile Sitz Bath.

THE LIEBEL-FLARSHEIM COMPANY.

The Liebel-Flarsheim Company cordially invites you to stop at their booth for examination and demonstration of their frequency-controlled Model SW-127 diathermy unit. Capable representatives will be on hand at all times to answer your questions about physical therapy apparatus. We hope you will stop by so that we may become acquainted.

J. E. LINDQUIST COMPANY.

New techniques in electrical stimulation of denervated and degenerated muscles will be demonstrated, using the improved CHRONOWAVE muscle stimulator. Please call at the booth or write for a complimentary set of the new muscle-nerve test charts.

J. E. LIPPINCOTT COMPANY.

J. E. Lippincott Company presents an interesting and active exhibit of professional publishing. With the "pulse of practice" centering in an advisory editorial board of active clinicians who constantly review the field, current and coming trends in medicine and surgery are known continually. On the studied recommendations of these medical leaders, Lippincott Selected Professional Books are undertaken.

PHILIP MORRIS & COMPANY.

Philip Morris & Company will demonstrate the method by which it was found that Philip Morris Cigarettes, in which diethylene glycol is used as the hygroscopic agent, are less irritating than other cigarettes. Their representative will be happy to discuss researches on this subject, and problems on the physiologic effects of smoking.

POORE & LOGAN MANUFACTURING COMPANY.

The "Vaso-Pneumatic" machine is a new approach to the movement of fluids in the extremities. It gives a constant gradient of pressure up or down the leg or arm, forcing fluids in their proper channels to flow normally while under pressure. The complete outfit is in a metal cabinet 18 by 18 by 33 inches high.

RAYTHEON MANUFACTURING COMPANY.

The Microtherm, Raytheon's up-to-the-minute microwave diathermy is featured. Completely post-war, the Microtherm offers an efficient, convenient and safe form of deep heating apparatus. Significant features are: high absorption, penetrating energy for deep heating, effective production of active hyperemia. Our representative will be pleased to greet you.

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TECA CORPORATION.

Teca Corporation, New York, N. Y., exhibits its latest models of low-volt generators. Shown are Low-Volt Generators CD6, SP3, and "Auto Surge" with original facilities and circuit divisions; also TECA Bitrodes, bipolar electrodes for testing and local treatments. The new Universal Model CD7 featuring variable frequencies, controllable surge and rest periods, and built-in Oscilloscope, will be demonstrated.

THERMO-ELECTRIC COMPANY.

Dickson Paraffin Baths pioneered and developed in cooperation with Cleveland Hospitals where Dickson Paraffin Baths have been in continuous use for ten to fifteen years. Mahogany mouldings designed for the comfort of the patient. Double control of the melting element insures maximum safety. Optional adjunct is a drain, patented. Three models will be shown.

WEBSTER THERAPEUTIC EQUIPMENT CO.

Eric Barkshat, afflicted with multiple sclerosis, wishes to demonstrate to you his two new resistance therapeutic exercisers, which through daily exercises, according to advice and instruction from physician, contribute to his steadily progressing rehabilitation. There will be shown the FOLDAWAY "JIM," a gymnasium foldable into a cabinet and the IF EXERCISER, a combination exercise boot, bar-bell and wrist exerciser.

THE MAX WOCHER & SON COMPANY.

The Max Wocher & Son Company will display their exceptionally complete line of physical therapy apparatus, including the latest Microtherm, Beck-Lee Electrocardiograph with camera attachment, infrared and ultraviolet equipment, and electrosurgical units of various types. The 111 year old house will have its experts available during the meeting for consultation on all equipment of this type.

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Tuition: None. For Scholarship to Cover Transportation and Maintenance Contact, National Foundation for Infantile Paralysis, 120 Broadway, New York 5, New York.

Entrance Dates: First Monday in January, April, July and October.

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Part I. Over-all care of convalescent polio with particular emphasis and special training in muscle testing and muscle reeducation.

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Each Part lasts three months and only selected students who have completed Part I will be admitted to Part II. All students applying for Part I must be willing to remain through Part II if selected.

For Information Write:

ROBERT L. BENNETT, M.D.
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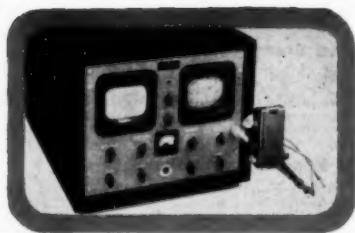
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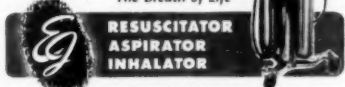


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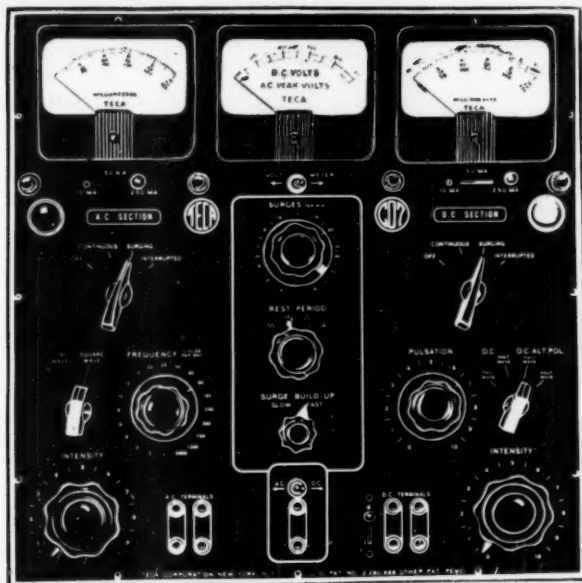
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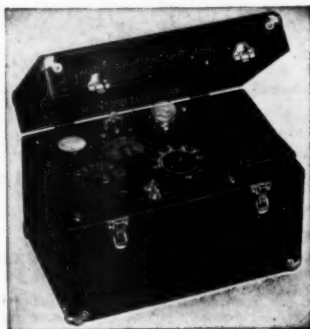
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